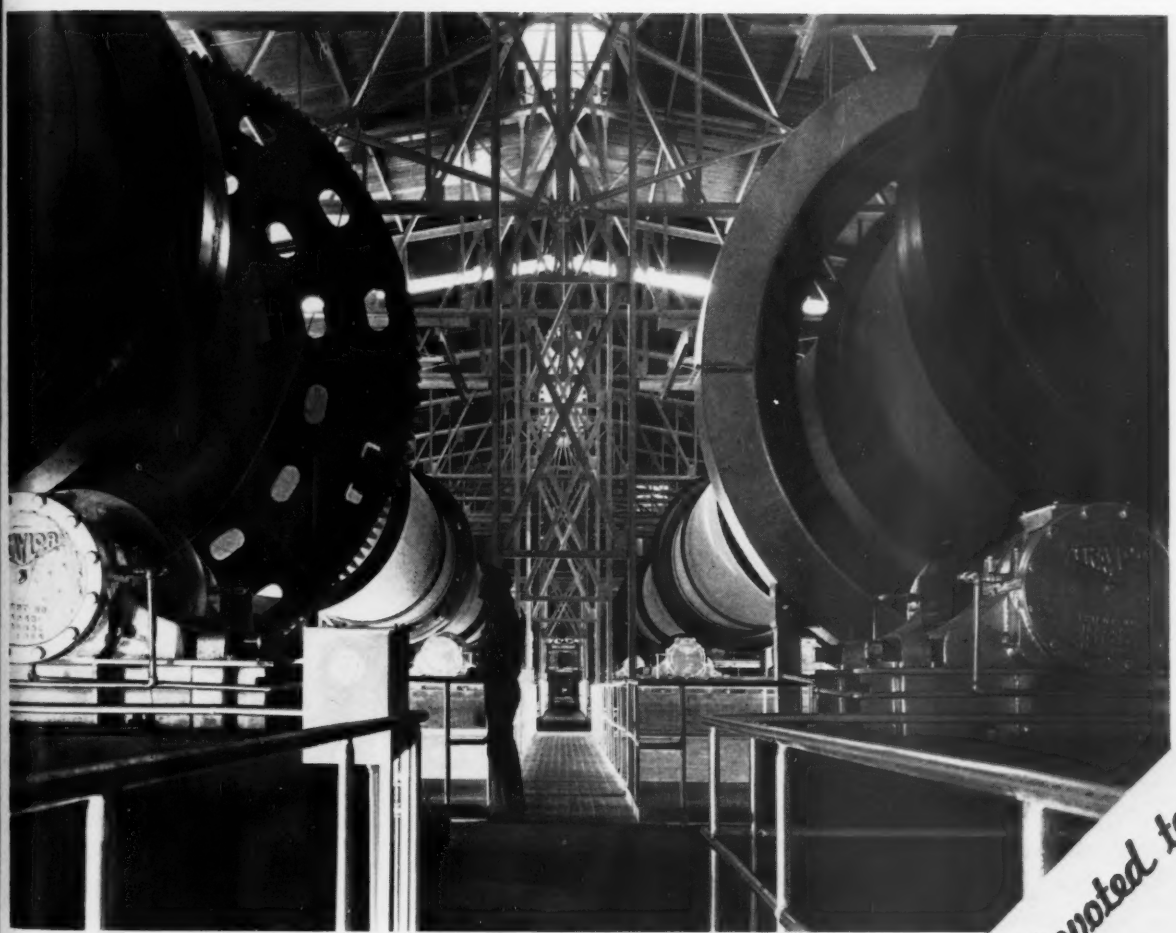
Western Industry

March 1954

Cement production in the West follows the lead of population growth. These kilns, 125 ft. long, fuse powdered materials into clinker to be ground in a ball mill.

. . . see page 36



A SMALL PLANT DOES IT

. . . makes industrial engineering pay

ATOM-RUN INDUSTRY

. . . just around the corner

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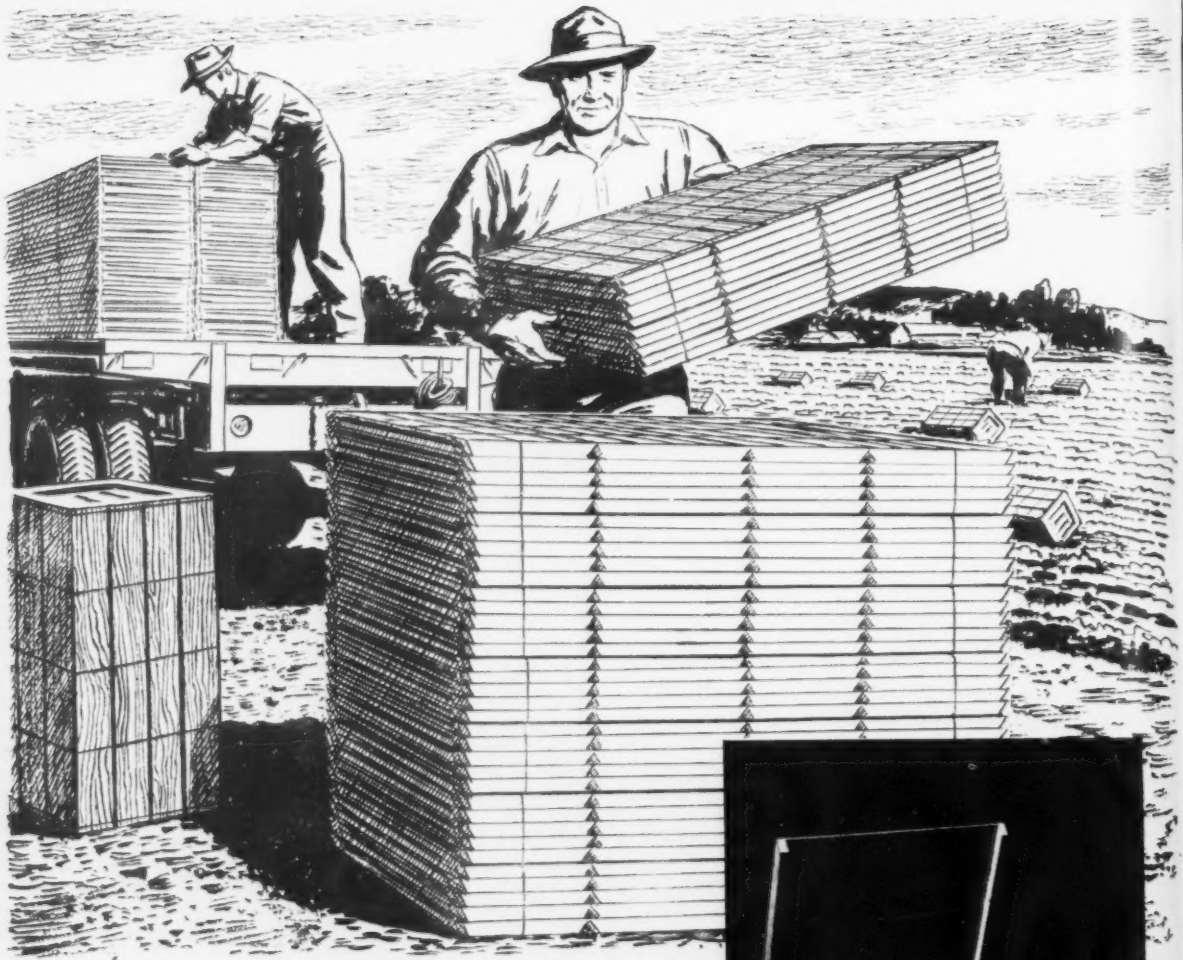
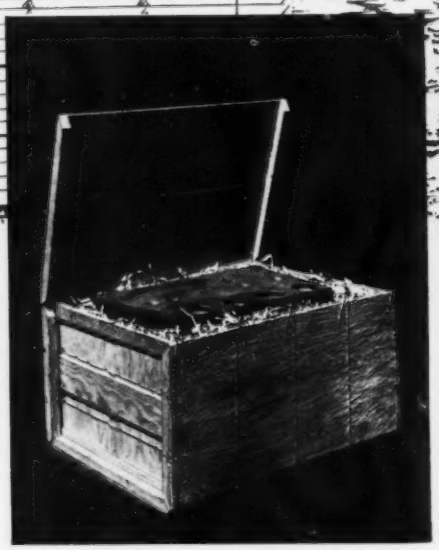
A Special Section Devoted to

METALS AND METALWORKING



You get more from CABCO

Service... means more than prompt delivery of local or mill shipments. At Cabco, service includes field consultation on tough shipping problems. Cabco has designed hundreds of wirebounds now standard in western produce and industrial shipping. Company engineers are in the field constantly, working with growers, shippers and manufacturers to develop containers for better handling, better out-turn. Better service is another reason why Cabco is the West's leading supplier of wooden shipping containers—and has been since 1883.



5 BULLDOZER BLADE TIPS weighing 56 lbs. each are shipped in this Cabco wirebound. Wooldridge Mfg. Company, makers of heavy-duty earth moving equipment, report a 16-minute saving in packing time over nailed boxes. Additional advantages include lower cost per box and lower shipping weight. How about your shipping problem?

Sold only by

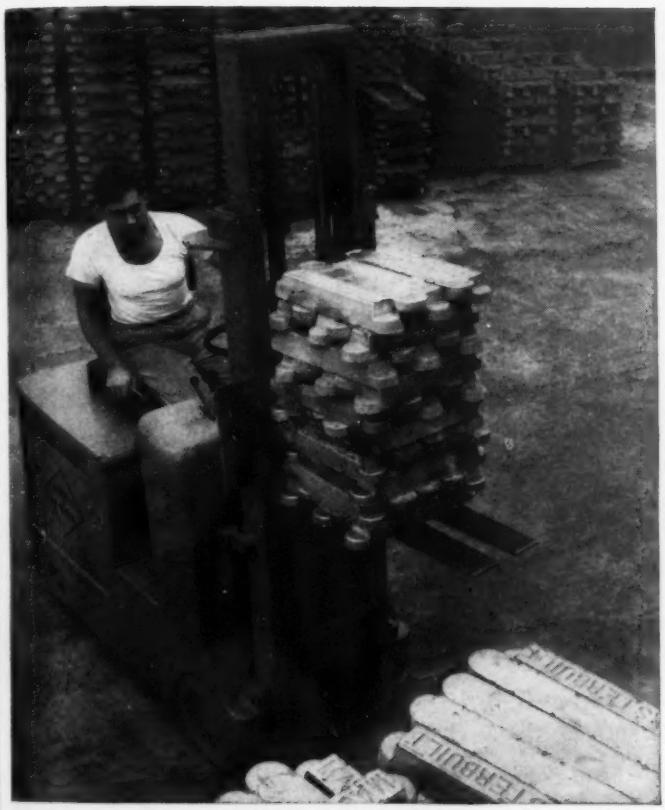
DUFF CALIFORNIA CO.

100 Bush Street, San Francisco 4 • 2581 E. Eighth Street, Los Angeles 23
501 Dooly Building, Salt Lake City 1

Cabco containers are a product of the California Barrel Company, Ltd., the West's foremost designer and manufacturer of wooden shipping containers

B.F.Goodrich

FREE TW TIRE AND WHEEL ANALYSIS can cut your tire maintenance costs 20% or more

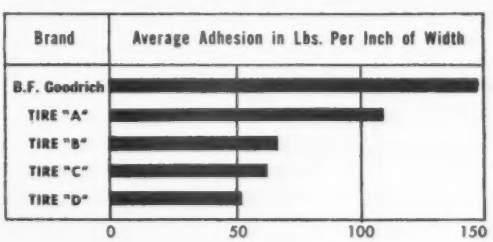


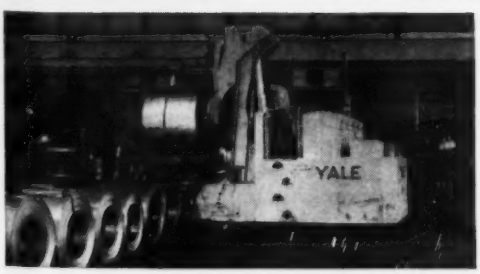
Tire maintenance costs cut 20%. Total tire costs lowered as much as 50%. Such savings have been reported by industrial tire users across the country through the use of the B. F. Goodrich Tire and Wheel Analysis Plan! Contact your local BFG retailer or mail the coupon below. Without cost or obligation, a trained B. F. Goodrich man will study your materials handling operations. He will tell you what type and size tires, what tread design and compound will serve you best.

The advice and counsel you get will be unbiased, for B. F. Goodrich makes a *complete* line of industrial tires. A special TW Analysis is available for manufacturers of industrial hauling equipment.

DO YOU HAVE THIS PROBLEM? Poor adhesion of rubber to steel caused this tire to fail prematurely. The chart below, based on extensive comparison tests of leading makes of tires, proves the superior adhesion qualities of BFG solid industrial tires.

Tests Prove B. F. Goodrich Adhesion Best





Heavy loads and equipment? Overloaded tires fail prematurely. Let BFG show you how to match tire and load.

Cutting and chipping? Rough hauling surfaces soon ruin tires. Your BFG man can show you how to get maximum tire life.

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Specify B. F. Goodrich tires when ordering new equipment

The B. F. Goodrich Company
Department TW-340
5400 E. Olympic Blvd.
Los Angeles 22, California

Please send me:

- ☐ Additional information on your Tire and Wheel Analysis Plan
- ☐ Free copy of "Industrial Tire Guidebook"
- ☐ Free copy of "How to Get Extra Service out of Solid Industrial Tires"

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Company_____

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Western Industry

MARCH 1954
Vol. XIX, No. 3

ARTICLES

METALS AND METALWORKING SECTION

DEPARTMENTS

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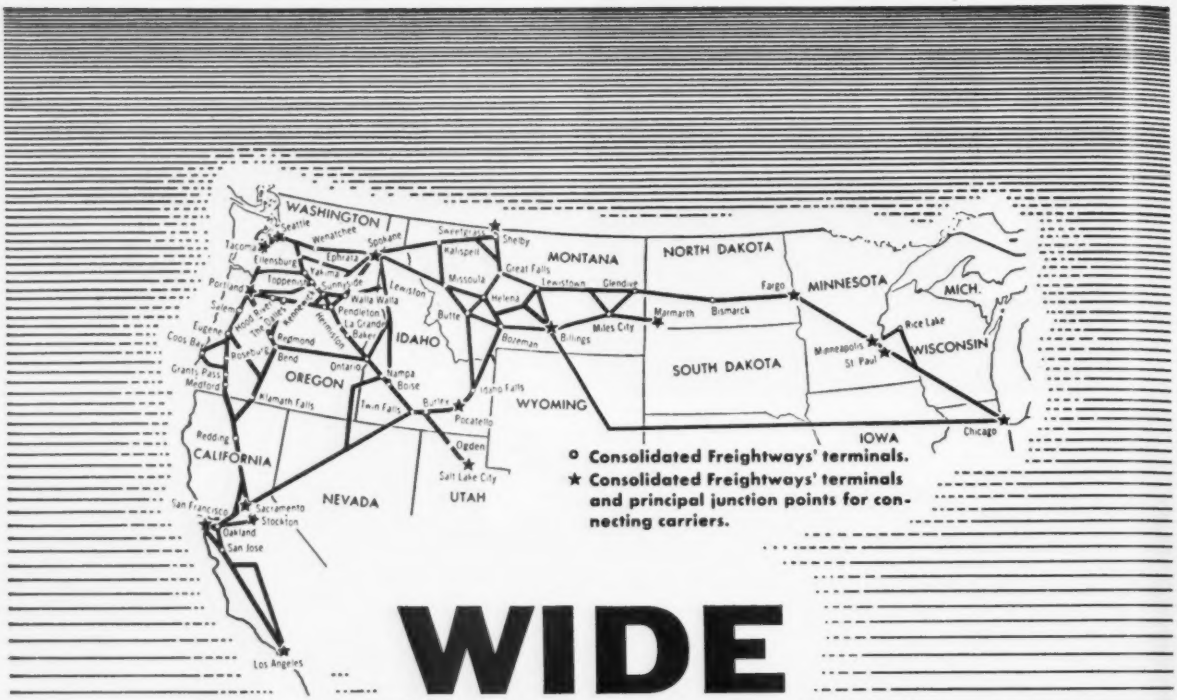
SERVING ALL INDUSTRY IN THE NATION'S FASTEST GROWING REGION



WIDE and LONG

WIDE COVERAGE

It's a big country from Chicago west—and it takes a big motor freight system to cover it.

In the territory from the Great Lakes to the Pacific Coast, Consolidated Freightways serves thousands of shippers daily at more than 900 points on 19,000 miles of routes. And in 60 important cities along the way, CF operates freight terminals and warehouses.

LONG EXPERIENCE

CF was founded in 1929 and is a pioneer in the comparatively young motor freight industry.

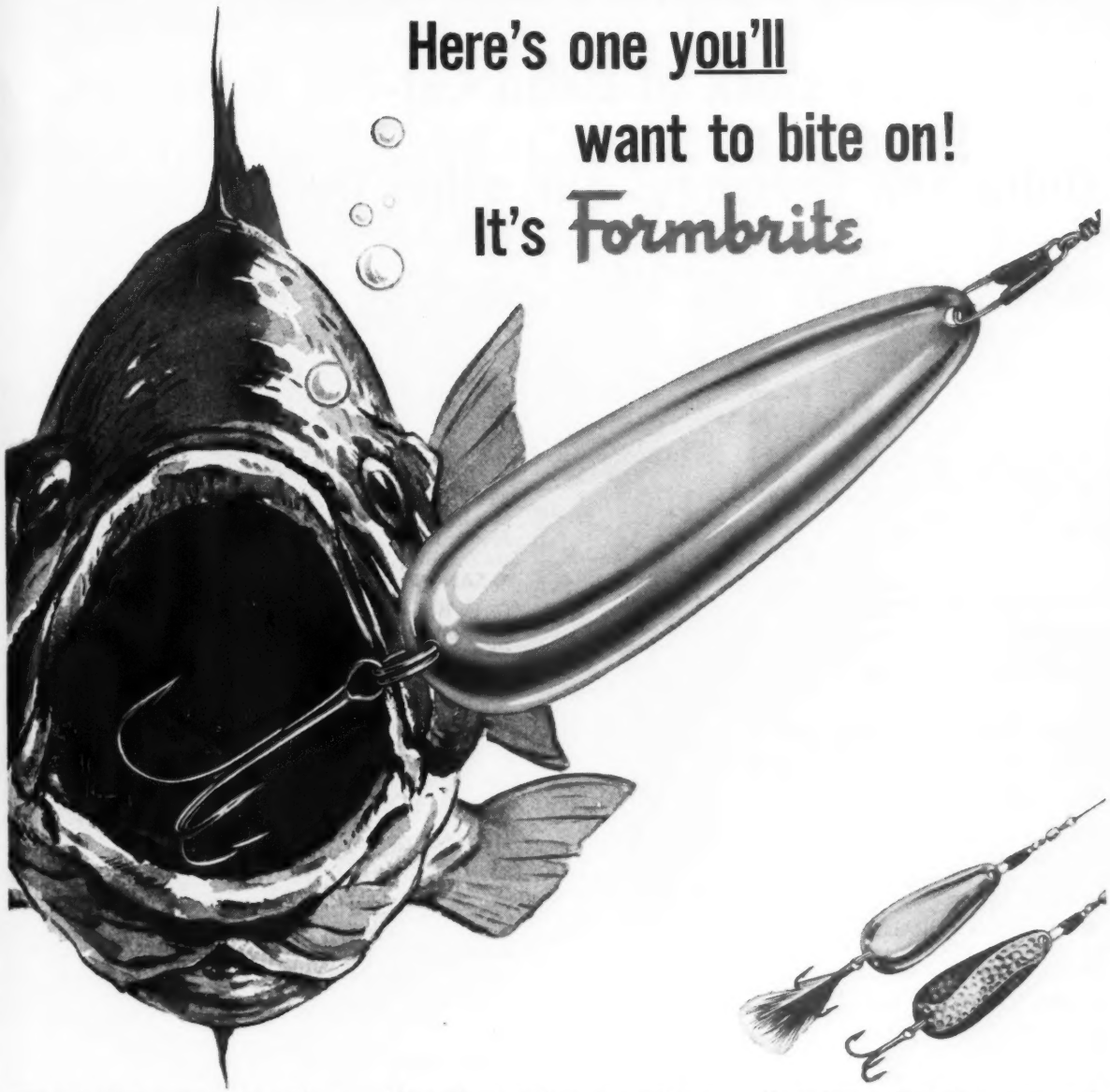
In 25 years of service to shippers the CF team has grown to nearly 4,000 friendly men and women. Carefully chosen at the start, these employees have been trained in the importance of responsibility to shippers and for skilled transportation and distribution service.

MAY WE SERVE YOU?

CONSOLIDATED FREIGHTWAYS

GENERAL OFFICES: P. O. Box 3618, PORTLAND 8, OREGON

Here's one you'll want to bite on! It's Formbrite



Upper lure is Formbrite. Lower one is made of ANACONDA Fancy Pattern Embossed Brass.

FISH find this particular line of brass spinners so attractive that fishermen's demands have built annual sales of the Aeroplane Tackle Manufacturing Company of Denver to more than two million lures of all types.

The high finish on the spinner is part of the secret. While the cost of producing this is of no interest to the fish, it is to the manufacturer. Recently all brass orders were changed to Formbrite*, the superior ANACONDA Drawing Brass that has enabled this firm to cut polishing costs over 25%, and on several stamped products to produce the required finish by tumbling only prior to lacquering or plating.

Formbrite, with its superfine grain, provides a surface far superior to ordinary drawing brass. It is stronger, harder, more scratch-resistant than ordinary brass, yet retains remarkable ductility for forming and drawing. It's a premium product at a non-premium price. If these features lure you, we should like to show you how this better brass can cut your product's finishing costs. Or write for Publication B-39 to *The American Brass Company, General Offices, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Limited, New Toronto, Ontario.*

Thirty-five years ago a fisherman, disgusted with his luck, cut up an old brass bait box to make himself a spinner resembling an old-time airplane propeller. Both fish and fisherman liked it so much, he started what is now a big and thriving business. *Reg. U.S. Pat. Off. 5392

DRAWING BRASS

An ANACONDA® product made by The American Brass Company

Your Western DELTA Dealer carries a complete stock of Delta Cut-Off Machines, Delta Belt Grinders, and other Delta Metalworking and Woodworking Power Tools

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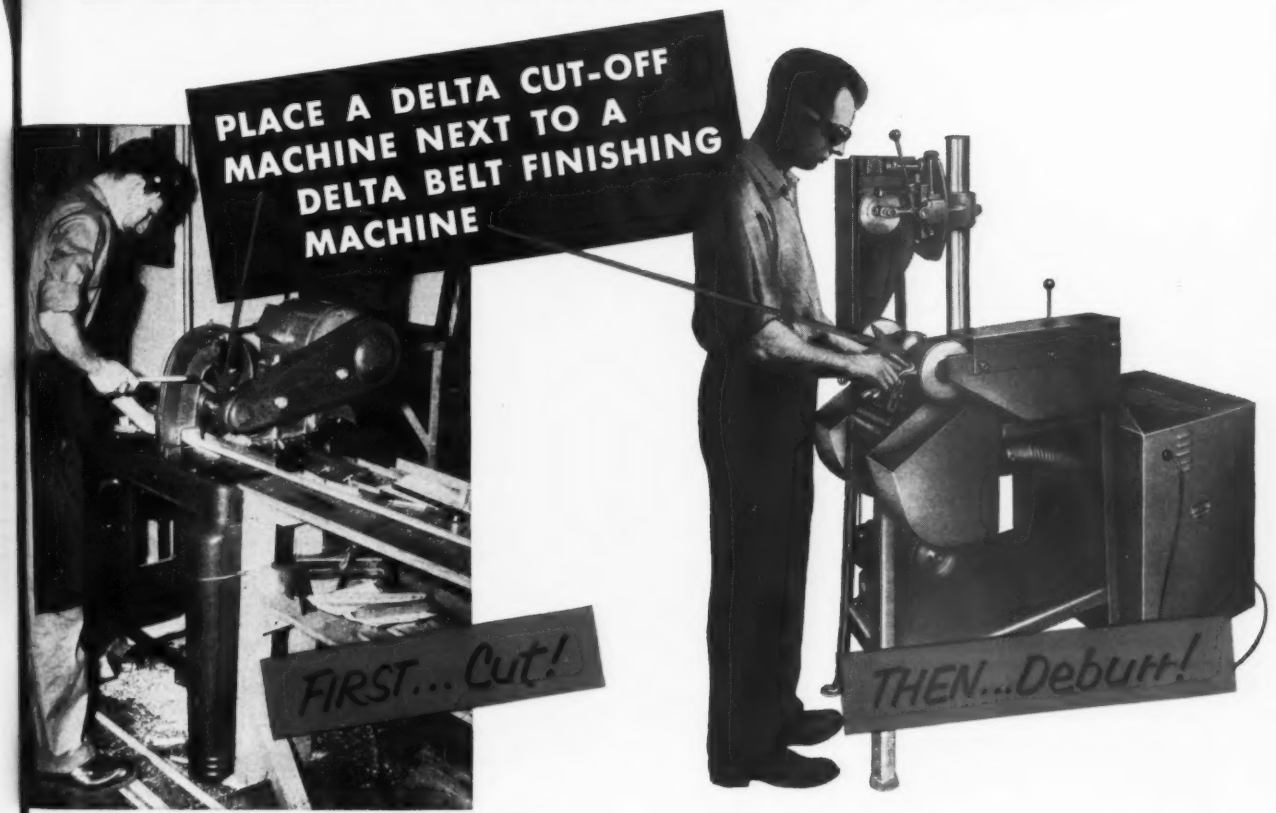
Reduce Cut-Off and Finishing Costs

WITH THIS LOW-COST HIGH-SPEED DELTA PRODUCTION TEAM!



FIRST—make the cut in one fast, easy motion on the Rockwell-built DELTA Cut-Off Machine. Smooth, clean cuts on steel or non-ferrous metals keep burrs to a minimum—speed production—greatly reduce per unit costs. The versatile DELTA Cutoff Machine saves money on hundreds of jobs presently handled manually, or on far costlier equipment. It will cut steel tubing up to 1¼", and non-ferrous metals up to 2" diameter or equivalent, with absolute accuracy.

SECOND—without lost time or motion—deburr each piece with a DELTA Belt Finishing Machine. This fast, versatile machine is a dependable production tool. A real time-saver, it is ideal for removal of casting headers as well as fast, on-the-spot deburring and finishing. It can be assembled into many combinations to fit your requirements, yet its low initial cost, rugged construction and complete portability enable you to cut costs on hundreds of operations in your shop.

Completely portable, these two Rockwell-built DELTA machines can be quickly shifted to any part of your shop, set up as a team, put to work cutting and finishing in a fast, cost-cutting sequence. You take the tools to the work, eliminating cumbersome, time-consuming stock handling. Your machine operators can cut and finish pieces while their machines are cycling automatically.

There are literally hundreds of ways in which these and other accurate, portable, low-cost DELTA tools can save money in your plant. Get in touch with your DELTA Dealer today—he's listed on the opposite page.

DELTA DUST COLLECTOR

The DELTA Dust Collector (shown above with the DELTA Belt Finishing Machine) is a self-contained, low-cost, portable unit, that can be attached to all types of abrasive machines. A powerful fan sucks both fine and heavy dust and small particles through a permanent, perfected air filter. The larger particles fall into a pan and are easily removed. Workers' health is protected, and harmful dust is kept away from machinery.

Delta Power Tool Division,
Rockwell Manufacturing Company
686C North Lexington Avenue, Pittsburgh 8, Pa.

DELTA QUALITY MAKES THE DIFFERENCE DELTA MILWAUKEE

DELTA QUALITY POWER TOOLS
Another Product by **Rockwell** ROCKWELL

Gladding, McBean & Co.

REFRACTORIES Reporter

NEWS-VIEWS OF INTERESTING WESTERN INDUSTRIAL DEVELOPMENTS

CONSTRUCTION MAINTENANCE TIPS

One of the versatile refractory products manufactured by Gladding, McBean & Co. is Tenax Refractory Mortar. This high temperature, air-setting mortar forms a strong chemical bond between brick at atmospheric temperatures. At elevated furnace temperatures, this air-set bond is replaced by a strong, permanent ceramic bond. Thus, firebrick set with Tenax are firmly bonded from the hot to the cold face, regardless of the temperature gradient through the wall. Tenax assures gas and air-tight joints and practically monolithic firebrick construction.

Under most operating conditions, destruction of firebrick laid with ordinary mortars begins at the joint. Strong, tough Tenax joints resist this attack, assuring longer brick life. As a result, walls are more resistant to high temperatures, spalling conditions, abrasion, flame erosion, chemical attack and other destruction conditions.

Because Tenax is uniformly blended to assure easy flowing, velvet-smooth workability, it can be used in several ways. Packaged in plastic form, its consistency

is ideal for trowelling. For thin-trowelled or dip joints, it can be diluted slightly with clean water. In this state, it is also ideal as a protective coating material for furnace walls. It can be applied by brush or air gun. 100 pounds of Tenax will provide a one-sixteenth inch coating over a 150 square foot area.

Tenax is packed in wet plastic form in 50, 100 and 200 pound air-tight steel drums. These drums have lug type covers which can be resealed.

Pictured below is the new steam-electric generating plant now under construction in San Fernando Valley. The reinforced concrete stacks (right) are 250 feet high. They are lined from the breeching point to the top with Gladding, McBean acid-proof brick and mortar.

NEW L. A. STEAM-ELECTRIC PLANT WILL INCREASE POWER CAPACITY 50 PERCENT

The first two units of Los Angeles Department of Water and Power's largest steam-electric power plant are now nearing completion in San Fernando Valley. Built to help meet increasing demands for electricity in Los Angeles, it will ultimately generate over 512,000 kilowatts, which is approximately equal to the total generating capacity available to Los Angeles from Hoover Dam. The first two generating units each have a capacity of 100,000 kilowatts. The Department of Water and Power designed each unit as an independent power plant.

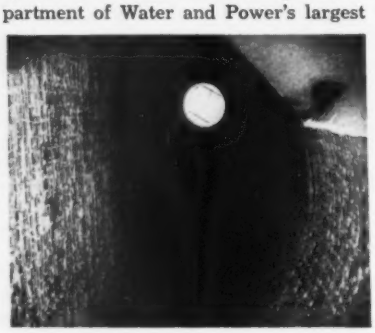
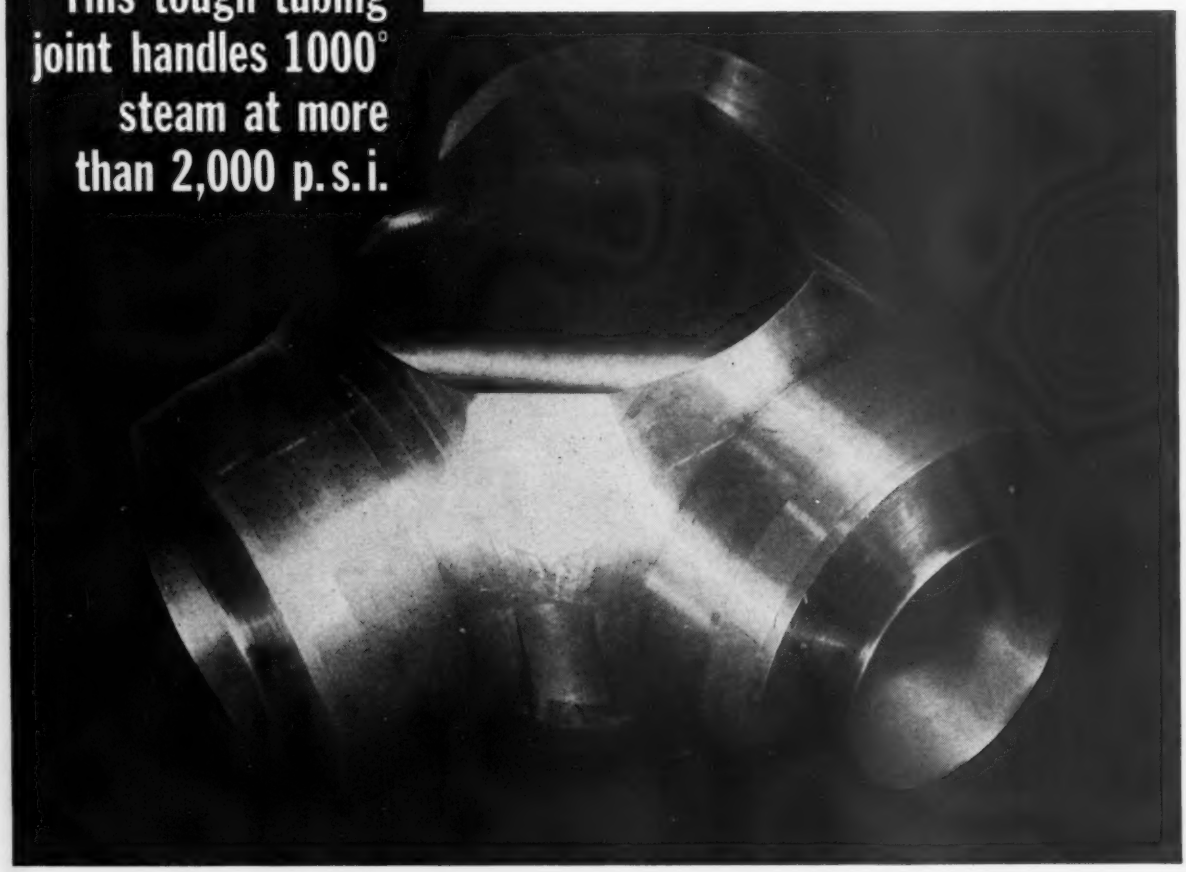


Photo at left shows interior of stack looking upward from the breeching level.

GMB FIRST IN THE FURNACES OF WESTERN INDUSTRY

SALES OFFICES: LOS ANGELES · SAN FRANCISCO · PORTLAND · SEATTLE · TACOMA · SPOKANE

This tough tubing joint handles 1000° steam at more than 2,000 p.s.i.



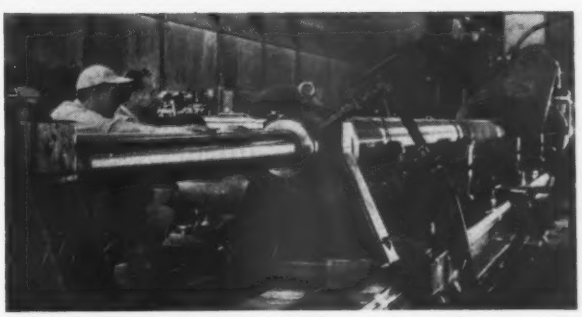
...it's high pressure, thick wall tubing produced by **NATIONAL SUPPLY**

High pressure tubing systems for steam generating plants are typical of the "custom-production" jobs performed daily at National Supply's Industrial Products Division.

The "Y" fitting shown above will be used as a juncture point for branching steam lines. Like the thick wall tubing lengths it will join, it is a solid alloy steel forging, precision bored and machined by National's skilled operators.

When installed, the entire tubing system—with the stamina to resist high pressures and temperatures—will insure maximum safety in steam conduction for its owners.

Whenever you have a problem in specialized equipment needs, you'll find it worthwhile to contact National Supply at Torrance. From melting furnace to finished product, National's complete facilities serve the most exacting needs of western industry—in many and varied ways. A telephone call can put these facilities to work for your advantage.



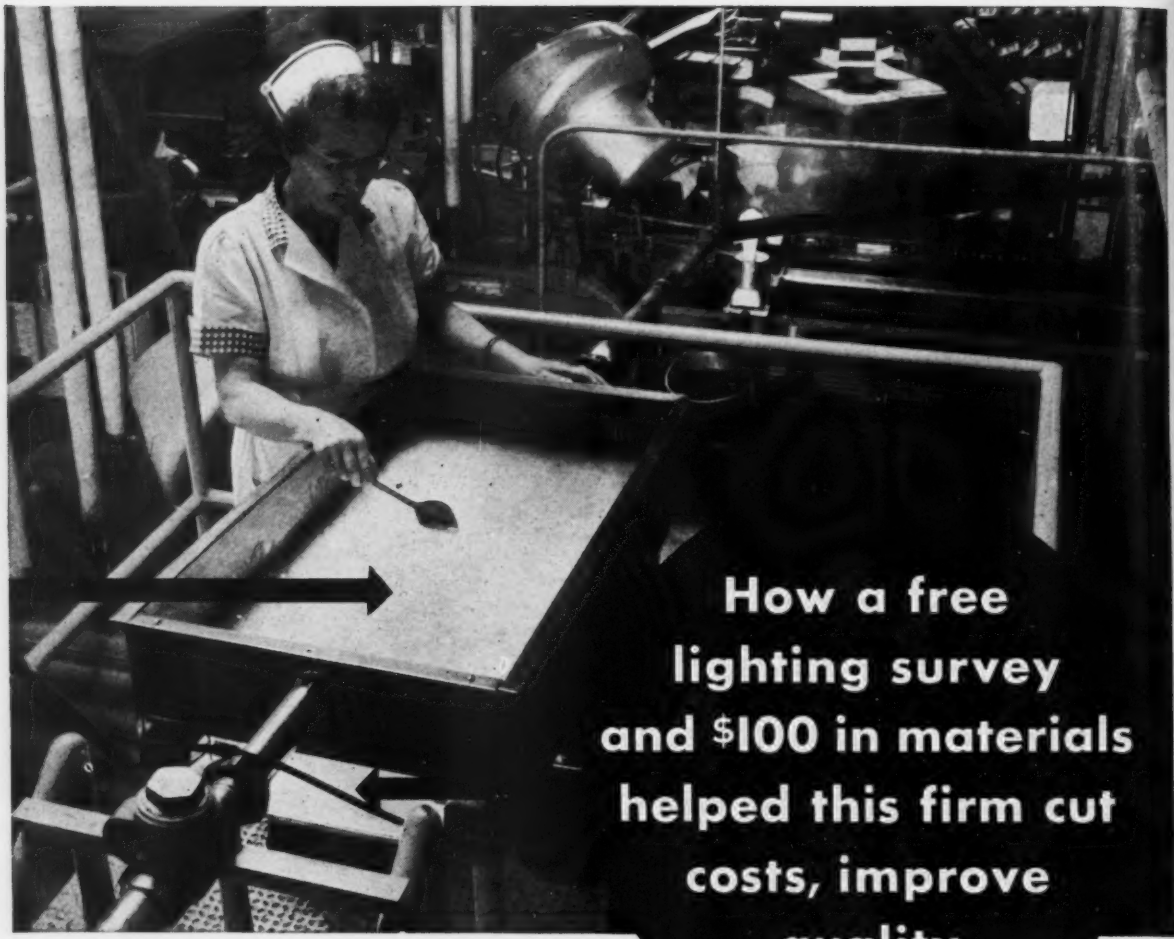
Boring operation on 14" diameter tubing with 2½" wall thickness. For this job, 18" diameter tubing with 3" wall thickness was also produced. Tubing up to 24" diameter and more than 40 feet in length is also available.

INDUSTRIAL PRODUCTS DIVISION

THE NATIONAL SUPPLY COMPANY

TORRANCE, CALIFORNIA • LOS ANGELES AREA

IDEAL PRESSED STEEL FORGINGS • BILLETS AND LARGE BARS
STEEL CASTINGS AND SPECIAL MACHINERY
MELTING • FORGING • CASTING • MACHINING • HEAT TREATING
ASSEMBLING • WELDING • TESTING



How a free lighting survey and $100 in materials helped this firm cut costs, improve quality

Planned lighting can possibly give you the same good results

The Tea Garden Products Company, of San Leandro, Calif., for many years inspected its preserves and jellies by passing them over a stainless steel table under high levels of overhead lighting. But this had a serious drawback: light reflected into the eyes of the inspectors, making close inspection difficult.

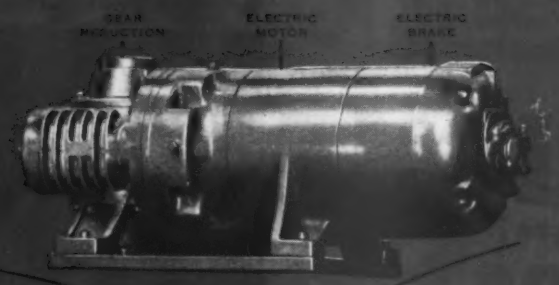
After a survey, P. G. and E. lighting engineers recommended a translucent table with lamps beneath a glass panel, as shown above. Now the preserves and jellies are clearly silhouetted against a luminous background. Result: one inspector easily does the work of several. Cost: only $100... for materials. The lighting survey was free.

Your business may be entirely different from Tea Garden's. But chances are, a correct seeing environment can also help raise the output and the quality of the work of your employees. It costs you nothing to find out. So let a P. G. and E. lighting engineer make a survey for you soon.

For free planned lighting advice, call your nearest P. G. and E. office today

P·G·and E·
PACIFIC GAS AND ELECTRIC COMPANY

405-X-354

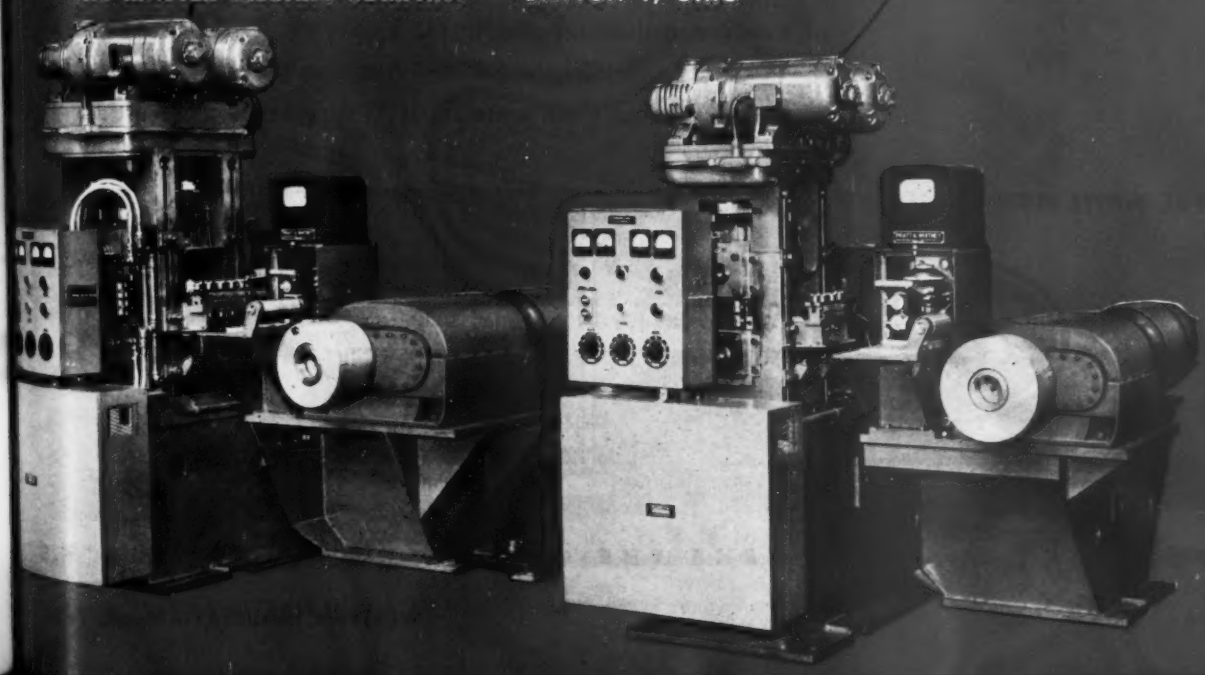


See how easily the standard electric motor, standard gear reduction, standard electric brake combine into a drive that gives the RIGHT horsepower, the RIGHT shaft speed, the RIGHT features . . . all in one compact unit. Nowhere else will you find power units that are so flexible, so easily adaptable, and in such a wide range of types and ratings.

Master power drives are available in thousands and thousands of ratings (⅛ to 400 HP) . . . in open, enclosed, splash proof, fan cooled, explosion proof . . . horizontal or vertical . . . for all phases, voltages and frequencies . . . in single speed, multi-speed and variable speed types . . . with or without flanges or other special features . . . with 5 types of gear reduction up to 430 to 1 ratio . . . with electric brakes . . . with fluid-drive . . . with mechanical or electronic variable speed units . . . and for every type of mounting . . . Master has them all and so can be completely impartial in helping you select the one best power drive for you.

standard units easily combine into special purpose drives

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



The Dairy Cooperative Association, Portland, Oregon, gains payload and does the hauling job right with White 3000s.

RIGHT for the job

Modern dairies depend on the high speed efficiency of special machines designed for a specific job.

WHITE 3000

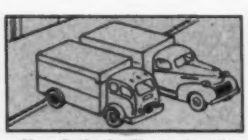
Today White brings to your hauling operations a new standard of truck performance—matching the efficiency of modern industrial machines. You owe it to yourself to discover the White 3000—America's *machine tool of transportation.* Call your local White representative.

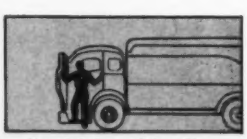
THE WHITE MOTOR COMPANY
CLEVELAND 1, OHIO.

White 3000

Factory Branches, Distributors and Dealers Everywhere


Greater Maneuverability


More Payload...Shorter Length


New Cab Saves Driver Time


More Efficient In Traffic


Better Visibility...Safety


Low Loading Height

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

Mass-Produced at Less Cost...

by HAYNES Investment Casting

Trade-Mark

PRODUCED FOR 74 PER CENT LESS

Originally this turbine wheel was machined from a 20-lb. forging to a final weight of a little over 1 lb. Now the part is produced by investment casting and only 2 oz. of metal is removed. Investment casting has brought about a 74 per cent reduction in production costs by saving strategic metal and machine time.

COST CUT 60 PER CENT

This investment-cast motor mount was made in a high-strength alloy at 60 per cent less than the cost of a forging. The mount bears the entire weight and torque of a 100-lb., 15-horsepower aircraft starter motor. The investment-cast parts require only four simple finishing operations.

ASSEMBLY COSTS REDUCED

Investment casting made it possible to produce this cylinder head in one piece, eliminating extra assembly costs. Machining was reduced to a minimum. The design of the part is special to investment casting. The castings weigh about 25 lb. and are 7 in. in diameter.

HAYNES *investment castings can solve some of your own production problems. For more information, contact the nearest Haynes Stellite Company office listed below.*

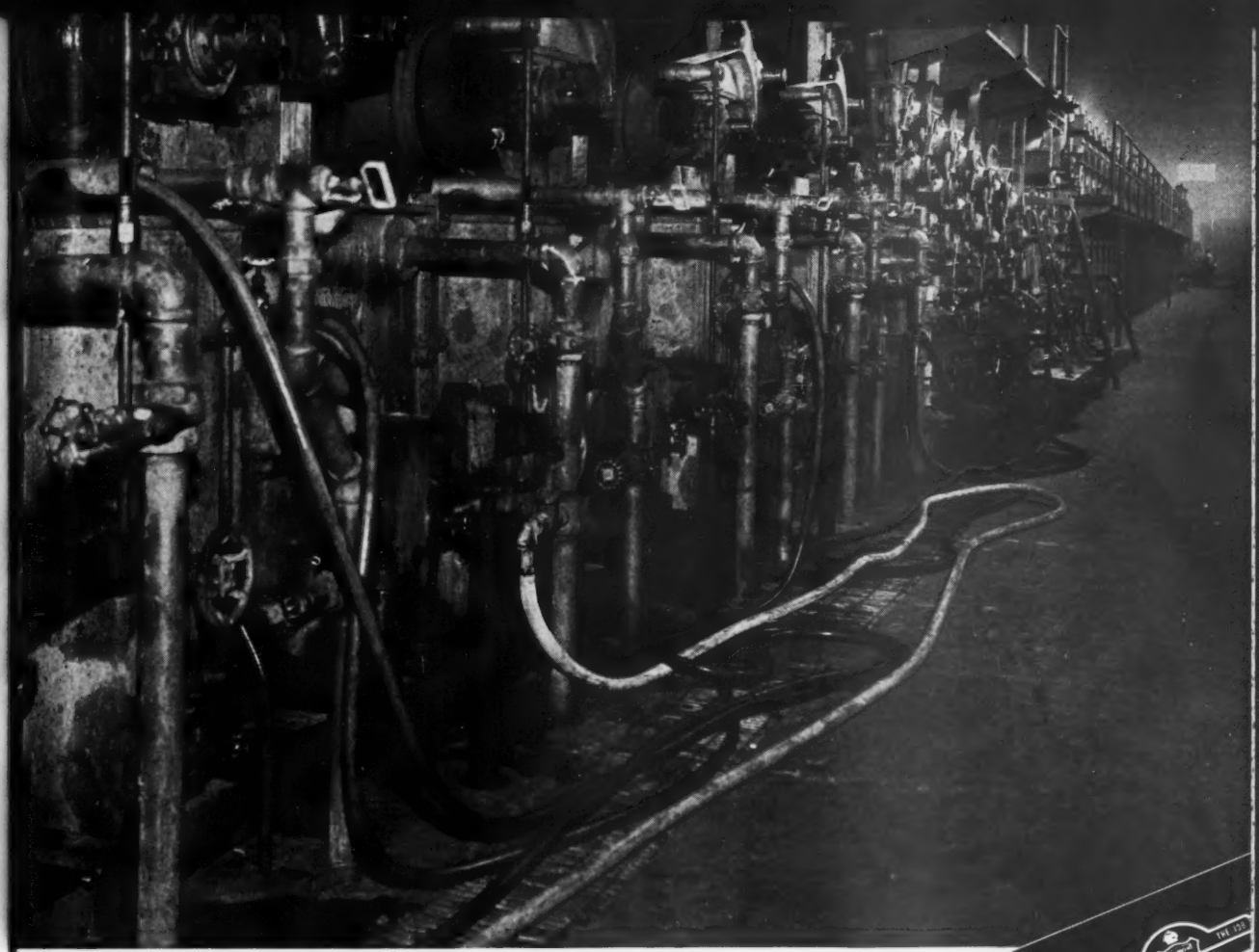
"Haynes" is a registered trade-mark of Union Carbide and Carbon Corporation

HAYNES INVESTMENT CASTINGS

TRADE-MARK

Sound, dense, high-strength parts available in cobalt-base alloys, nickel-base alloys, iron-base alloys, stainless steels, and alloy and carbon steel.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa



Thermoid Hose Versatility Cuts Your Costs

Thermoid Industrial Rubber Products — Quality — Service

The versatility of Thermoid multi-purpose hose makes stocks of many different types unnecessary. You cut your hose cost through reduced inventories, simplified buying and less storage space. Losses from end remnants are greatly reduced.

VERSAFLEX — Excellent for handling air, water or oil under high pressure. Use also for butane, propane and as fire fighting booster hose. Red cover.

VERSICON — Most versatile hose ever offered. Handles air, water, oils, greases, gases and dilute acids. A real inventory-saver! Brown cover.

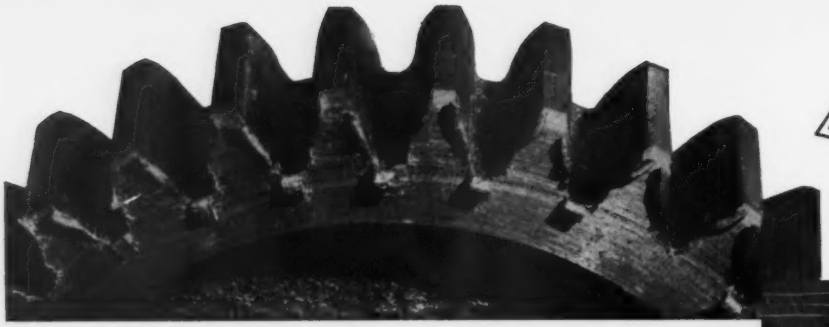
AQUAIR — Handles air, water, gases where oil is not present. Ideal for oxygen and acetylene welding operations. Tough, yet light and flexible. Green cover.

In addition, Thermoid makes other types of hose for specific applications, such as paint spray, sand blast, dust collecting, etc. Call your Thermoid Distributor. He can help you select the hose best suited for your requirements. Or write direct for our latest catalogs.

Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N.J. Nephi, Utah



OSBORN

You get *Quality*

Osborn teams up with engineers to apply brushing power to many deburring, finishing and cleaning operations. This design and production know-how, plus the right brushes for the job assures profitable results.

when you specify
DEBURR AND BLEND

THE lower picture shows the results obtained with an Osborn Brushamatic Machine. This power brushing method does what hand deburring cannot accomplish . . . it removes burrs and feather edges thoroughly and it *blends* surface junctures. The resultant smooth radius of edges decreases stress concentrations, improves service life. Its quality is *uniform* piece after piece.

When you specify this modern method, you also get *faster production!* The gear shown required 3 minutes for hand deburring and only 18 seconds by the Brushamatic method.

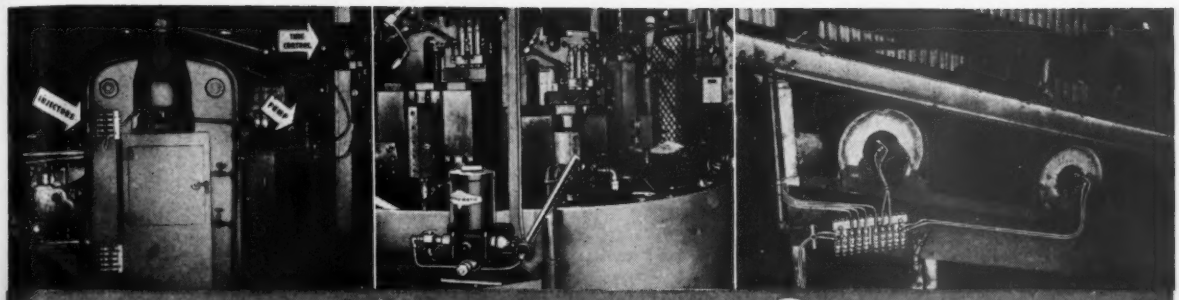
Your **O**sborn **B**rushing **A**nalyst will gladly help you find out how this or other push button brushing operations can be applied to your problems. Call your **OBA** today or write *The Osborn Manufacturing Co., Dept. LL-10, 5401 Hamilton Ave., Cleveland 14, Ohio.*

This booklet suggests many ways by which Osborn Power Brushes improve products and lower costs. Write for your free copy of "Automatic Deburring."

Osborn Brushes

OSBORN BRUSHING METHODS • POWER, MAINTENANCE AND PAINT BRUSHES • BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

BRANCH OFFICES: Los Angeles: 448 South Hill Street; San Francisco: 666 Mission Street, Builders Exchange Building.

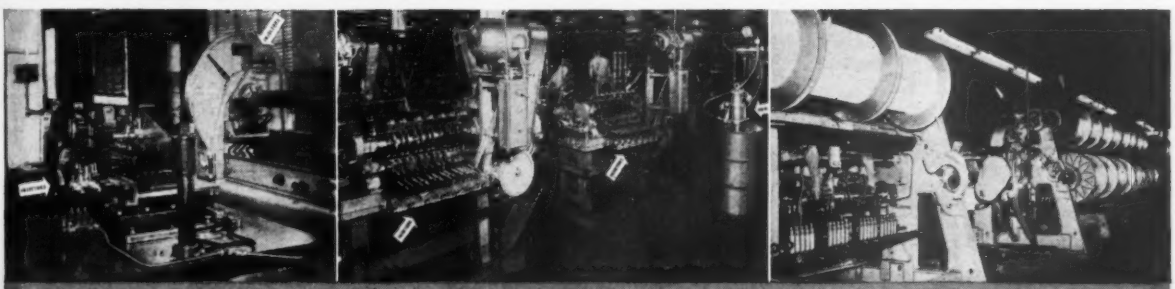


1 REDUCES REPAIRS
Lincoln Centralized Lubrication INCREASES BEARING LIFE 1500%, ... power consumption reduced 30%. The Miller Company.

2 PRODUCTION INCREASED
Production increased 20%... equal to twelve new machines costing $816,000. And, $100,000 saved in maintenance, bearings, etc. Spicer Manufacturing Company.

3 CONSERVES MANPOWER
Lincoln System saves $32,240.00 a year in labor alone in coal preparation plant. Hanna Coal Company.

6 REASONS WHY
industry is installing *Lincoln* CENTRALIZED LUBRICATION SYSTEMS



4 REDUCES LUBRICANT CONSUMPTION
Lubricant consumption has been reduced by 50% and production increased. Cudahy Brothers.

5 REDUCES REJECTS
Rejects slashed 80%... production increased... operator efficiency increased. Motor Car Manufacturer, Flint, Michigan.

6 REDUCES POWER CONSUMPTION
Power cost reduced 20%, production increased 22%. Konit Mills.

TO REDUCE OPERATING COSTS...FAST! ...A PROVEN IDEA WORTH THOUSANDS OF DOLLARS TO *EVERY PLANT*

You can do what these corporations and hundreds like them have done to slash operating costs by applying the right lubricant, in the right quantity, at the right time—automatically, with a Lincoln system.

Lincoln
the most trustworthy name in lubricating equipment

LINCOLN ENGINEERING COMPANY OF CALIFORNIA
LOS ANGELES, 2844 South Grand Ave.
BERKELEY, 3033 San Pablo Ave.
PORTLAND, ORE., 1018 S. E. 8th Ave.

Write for your FREE copy of Lincoln's new Catalog 80, showing the most complete range of Centralized Lubricant Application Systems on the market. Lincoln Lubrication Engineers will gladly work with you to determine the best lubrication system for your needs.

SEND THIS COUPON NOW

To LINCOLN ENGINEERING CO. OF CALIFORNIA
2844 South Grand Avenue, Los Angeles

☐ Please send me Lincoln Catalog 80
☐ Have an engineer call.

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Company.....

Address.....

City..... Zone..... State.....

UNITED STATES STEEL AT WORK IN THE WEST—the world-famous cable cars of San Francisco, Calif.

SYMBOL OF A CITY . . . with a lifeline of steel!

Since 1873, when the cable cars first came to San Francisco, they have remained as the one outstanding symbol of the city by the Golden Gate. Up and down the hills they go, holding tight to their cable of steel. And from the earliest days, these steel cables have been produced in the Western mills of United States Steel.

For any job, big or small—Columbia-Geneva for years has made steel of many types. We hope that when you need steel, you'll continue to look first to Columbia-Geneva, Western producing member of the industrial family that serves the nation—United States Steel.

West's Largest Steel Producer

United States Steel Corporation · Columbia-Geneva Steel Division

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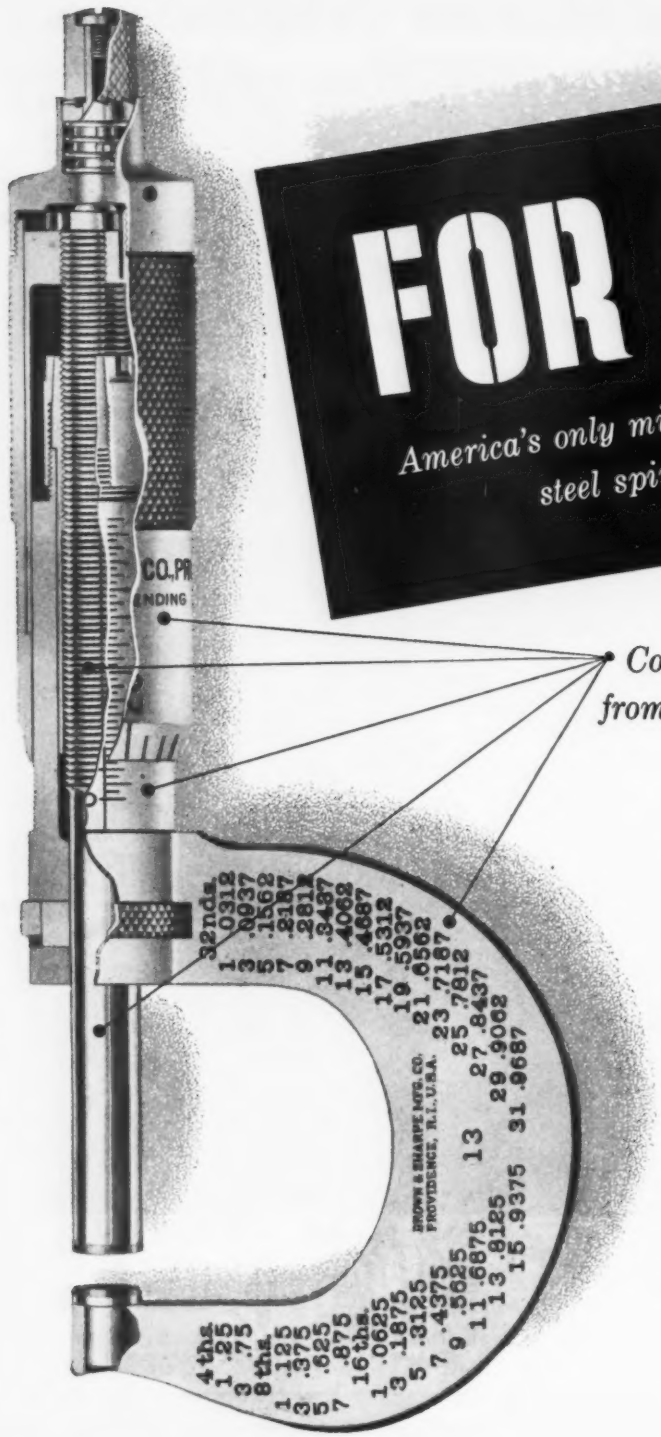
USS

UNITED STATES STEEL



FOR SALE

America's only micrometers with stainless steel spindle and screw!

Completely protected from rust or stain!

NEW BROWN & SHARPE MICROMETERS give you complete protection from common causes of excessive wear and loss of reading accuracy ... rust and stain. Exclusive stainless steel, one-piece spindle and screw with hardened and ground threads is permanently rust-proof. Dull chrome frame and thimble resist acid perspiration and other causes of stain.

Many other quality features, such as carbide measuring faces and large diameter thimbles with easy-to-read graduations, make these new micrometers longer wearing, more accurate, and easier to use. Like all Brown & Sharpe Products, they are designed to be the best obtainable. Write for Catalog 35M.

For prompt, efficient, accurate delivery of these and many other tools or abrasives from the West's largest and most up-to-date stocks, call Pacific Abrasive Supply Co. today.

Have you availed yourself of Pacific Abrasive Supply Co's "Round Table"?

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CHASE BRASS HAS MOVED!

LOS ANGELES'

Brass & Copper Headquarters is now at 6500 East Washington Boulevard

GOOD NEWS—for brass and copper buyers all over the Los Angeles area. February 15, 1954—we of Chase opened the doors of a brand new, fully equipped warehouse in a convenient new location.

For over 25 years now, we've been serving Los Angeles brass and copper buyers at our old address—210 S. Central Avenue. Now . . . we're set to serve you even better! This streamlined unit is just one more of the many up-to-date warehouses in the Chase Network, the largest brass and copper distribution system in the world!

Our new, larger floor space gives us room for an extensive stock of rod, sheet, wire and tube in many different sizes and tempers. Plus that, we're carrying a wide variety of miscellaneous items, such as nuts, screws, bolts, rivets, washers, fittings and many others. We'll do slitting, shearing, sawing exactly to your specifications. The latest in handling, weighing and storage equipment will enable us to accommodate your orders with unbeatable speed and efficiency.

We hope you'll come and see us in our new headquarters. Or . . . call us at **RAymond 3-5351.**

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DALLAS 2, TEXAS • 119 Pittsburgh St., Tel. PRospect 4271
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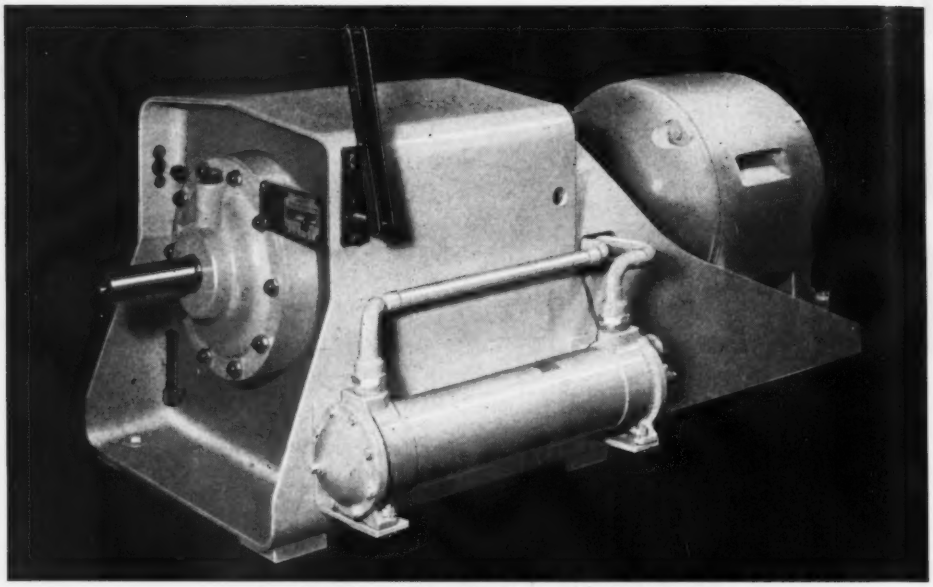
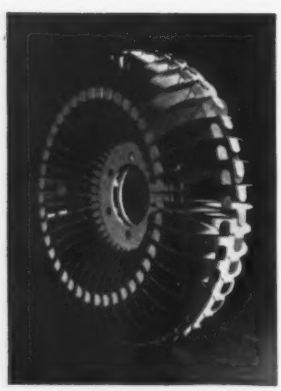
ANNOUNCING THE NEW AMERICAN BLOWER

Gýrol FLUID DRIVE

TYPE VS CLASS 2



American Blower Type VS Class 2 Gýrol Fluid Drive



A phantom view of the driving and driven members, which provide smooth, reversible power transmission.

- **Can be reversed while in motion at any variable operating speed by merely reversing direction of rotation of motor**
- **Permits adjustable speed control over a wide range**
- **Built in several standard arrangements**

HERE IT IS! A brand-new fluid drive that will help you solve many tough industrial-drive problems. It's the American Blower Type VS Class 2 Gýrol Fluid Drive. A compact, self-contained, adjustable speed unit.

The result of years of development and research, this adjustable-speed fluid coupling is crammed with features. It has unlimited application possibilities, with its wide-range, stepless speed, reversible control. Even on constant-torque loads, a 4-to-1 speed range is obtainable!

It permits driving motors to reach full-load speed before engaging the load. In many cases simple across-the-line starting may be used. Adjustable speed may be obtained by either automatic or manual adjustment of the speed-control lever.

The new Type VS Class 2 Gýrol Fluid Drive is available in six sizes . . . 7½ through 800 h.p., at normal motor speeds up to 1800 r.p.m. Built in five standard arrangements, it can be used on a wide variety of industrial applications.

For complete information about the Gýrol Fluid Drive line, give your nearest American Blower Branch Office a call, or write us direct for free literature.

For smaller applications the Type TM Constant Speed Gýrol Fluid Drive is available in ratings from 1 to 20 h.p.

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Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS • SUNBEAM AIR CONDITIONERS

New RPM Automotive Grease Does the Work of 4 Special Greases

Proved in the field in heavy-duty equipment, RPM Automotive Grease fully protects wheel bearings, chassis bearings, universal joints and water pumps, as well as fifth wheels and many other greased bearings. You can save time, work and money by using this stable multi-purpose grease. It stays in bearings and maintains proper consistency even when units operate in mud, water, freezing cold or extreme heat!

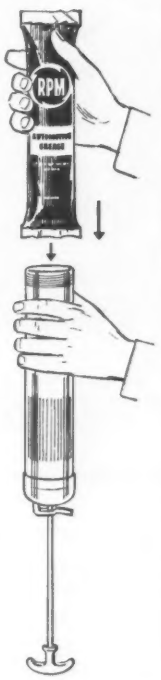
SAVES TIME! RPM Automotive Grease simplifies and speeds up lubrication jobs . . . no stopping to change guns . . . no lost time explaining complicated lubrication procedures to employees.

SAVES WORK! With RPM Automotive Grease, you have only one gun to fill . . . one gun to keep clean, in place of four. With only one grease container to move, you save work and space in the oil house.

SAVES MONEY! RPM Automotive Grease saves many dollars in lubrication time, cuts repair expense by preventing use of wrong type grease. You buy only one grease, need only one grease gun, lose less grease from waste and contamination.

EXCLUSIVE, CONVENIENT PACKAGING

RPM Automotive Grease is available in a new, exclusive 12-ounce grease cartridge in addition to the usual containers. The RPM Grease Cartridge ends waste, speeds loading, prevents smears on your hands, clothes and grease gun. Just slit the top, drop cartridge into gun, replace pumphead. These sealed cartridges prevent contamination of grease, end grease storage and handling problems, convert a messy job into a simple, clean operation!



Try RPM Automotive Grease today! Give yourself the benefits of this proven multi-purpose grease . . . call your Standard Fuel and Lubricant Engineer or Representative now for full information, or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

Six bucks to repair a six-buck item?

Too much? Maybe so, but it's happening all the time. At today's maintenance rates of $3 to $4 an hour, regrinding a valve seat isn't a small job any more. Nor is repacking a valve, or installing a new one. Even replacing an ordinary pipe fitting isn't the same job it used to be.

You see, piping maintenance labor has gone up along with all other costs. That's why any excessive maintenance can quickly equal or exceed equipment cost.

You'll meet this problem best by insisting on the most dependable quality in piping materials. By having greater assurance they will stay on the job longer, need fewer repairs, cause less trouble. By standardizing on Crane Quality—the choice of thrifty buyers in every industry.

Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill. *Branches and Wholesalers Serving All Industrial Areas.*

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NEWS
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West Coast
Industry

FIRST NATIONALLY KNOWN INVESTMENT CASTING PLANT TO LOCATE IN L.A.

ARWOOD BUILDS PLANT #4 ON WEST COAST

Centrally located investment casting plant offers easy access to time-saving, economical process.

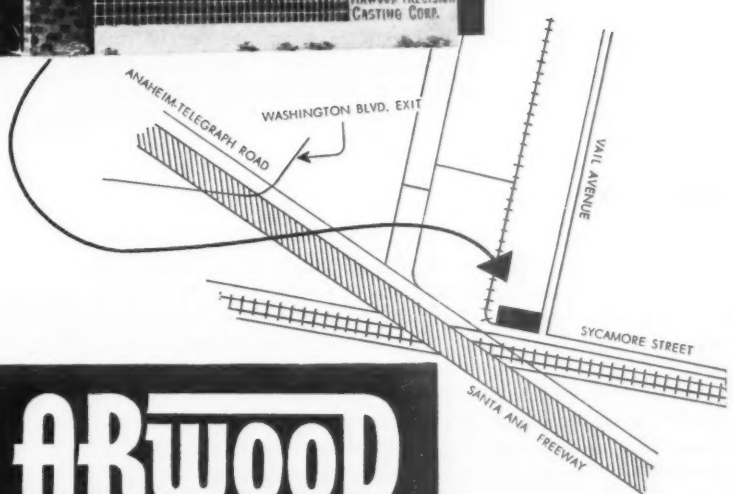
Arwood is now building a 26,000 sq. ft. investment casting plant at Vail Avenue at Sycamore Street in Los Angeles to better serve West Coast Industries.

Plans include complete modern equipment for efficient mass production of highest quality investment castings. Tooling, metallurgical and testing facilities are an integral part of the plan.

ON-THE-SPOT ENGINEERING AID WHILE UNDER CONSTRUCTION

Sales office is now open across the street from the new plant where Arwood engineers will be available immediately for discussion of design, alloy and cost. Take advantage of the experience of Arwood's three eastern plants in producing aircraft and electronic parts and castings for many other industries.

Special air service will speed pilot and sample runs from Arwood's three Eastern Plants until the new plant is in operation.



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Western Industry

EDITORIALS

Demonstration beats legislation

NEITHER SUBCONTRACTORS, farmers, miners, publishers or any other group need to be "saved" by the government if they cannot stand on their own feet, in our opinion. All the government support programs in the world will not prevent butter becoming as obsolete as buggy whips in another ten years.

Consequently it is refreshing to hear the tool and die people in Southern California plead their case for survival on the basis that they are providing a more efficient service than any prime contractor is capable of. Not legislation but demonstration, is the answer to any tendency of airframe plants or other prime military contractors to economize by decreasing their subcontracting and manufacturing more components and parts under their own roofs.

While there are recent reports of automobile manufacturers trying to economize by this method, history does not seem to indicate that they have found it too successful.

"Vehicle manufacturers have blown hot and cold, over the years, on the desirability of attempting to monopolize the manufacture of the functional parts of their automobiles," says John W. Anderson, president of the National Patent Council. "Certain of the larger vehicle makers are understood to have admitted from time to time that the independent smaller manufacturer, specializing in a particular category of components, usually can make these components better—and can advance their functional competence with greater certainty—than can the assembly-minded big manufacturer."

The Southern California tool and die group are on the right track when they hammer this argument home. They make it far less likely that primes and military contracting authorities will fail to think things through.

Approaching sanity

ANOTHER SIGN of approaching sanity in the Pacific Northwest power situation. Aluminum Company of America is suggesting that it may spend its own money to build dams, in order to insure a sure long-term supply of firm hydro-electric power and free its Vancouver and Wenatchee plants of the uncertainties of interruptible contracts.

As the area is considered to have the greatest untapped hydro possibilities in the nation, there is no reason why the biggest users of current, the electro-chemical industries, should not have the privilege and responsibility of finding their own sources of supply. For a long term the area has been under the spell that the federal government is the only organization big enough—and responsive enough to public interest—to undertake the job of developing hydro-electric power. Fortunately, the spell is beginning to be broken and the more natural and logical courses of action are developing.

A possibility

WHEN BUSINESSMEN buy advertising space in union-sponsored papers, they may be buying their own destruction, since such publications consistently attack profits, business practices and employers, says the weekly letter of the Industrial Relations Council of Utah. Quite so, if employers are merely advertising their own merchandise.

The Council, however, seems to overlook the possibility that advertisers in such papers might, through the use of the right kind of copy, discreetly counteract the picturing of employers as greedy persons engaged in a giant conspiracy to create unemployment and depression. Obviously, it would be silly to rant and rave, but advertising copy calling attention to the number of jobs the employer has created, and some of the other constructive things he does, might be difficult for the union paper to refuse.

How about Your GEARING PROBLEM?

$$\frac{R_1}{R_2} \cdot \frac{V_1}{V_2} = \frac{X_1 - 1}{X_2}$$

Is it PURE THEORY or

REPLACEMENT of OLD EQUIPMENT?

ASK WESTERN GEAR

In either case, Western Gear engineers are waiting to serve you, backed by a storehouse of knowledge gained since 1888.

Catalogs Available: **Manufacturing Information No. 5200 • High Speed Gear Units No. 5204 • Herringbone Speed Reducers No. 4802 Right-Angle Speed Reducers No. 5203**

Write, wire or phone for immediate service – Executive offices, Western Gear Works, P.O. Box 182, Lynwood, California

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PACIFIC-WESTERN PRODUCTS | POWER TRANSMISSION GEARS • MACHINERY •

PACIFIC GEAR & TOOL WORKS · SOUTH WESTERN GEAR WORKS

Plants at Lynwood, Pasadena, Belmont, San Francisco, (Calif.), Seattle and Houston—Representatives in Principal Cities.

LETTERS

Contributions to this column from our readers are welcome. Names will be withheld from publication if so requested. Unsigned letters, however, will be disregarded.

Alaska calling

Editor, WESTERN INDUSTRY:

I was very interested in your article, "Profit Sharing in Actual Practice."

Ours is a very small industry with only about 50 employees but in an expanding market.

We have for the past four years been considering some profit sharing plan, but haven't been able to procure any direct data on proven plans.

Is it possible for us to procure such information from the Council of Profit Sharing Industries?

I would very much appreciate any information available.

ARTHUR F. WALDRON
President, Anchorage Sand & Gravel Co., Inc.
Anchorage, Alaska

Whose hardboard machine?

Editor, WESTERN INDUSTRY:

On page 103 of the January 1954 issue of WESTERN INDUSTRY is an article regarding hardboard.

This article mentions, near the bottom of the first column, a processing machine developed in England which was offered for sale on the Pacific Coast. Apparently this machine processes hardboard in a continuous strip method, rather than the generally accepted method of pressing the chemically treated raw material into boards of standard wallboard size, that is, 4 x 8 ft.

Insofar as you know, can this machine be seen anywhere in the Pacific Coast area, and with whom could we correspond to secure detailed information regarding the same?

C. R. HARMON
Sacramento, Calif.

Comments on Review and Forecast

Editor, WESTERN INDUSTRY:

We enjoyed very much listening to Mr. Chet Huntley of ABC yesterday evening and are most anxious to see and read your January issue.

For the enclosed check please forward two copies marked for the writer's attention.

HOWARD E. COCHRAN
Henry Broderick Inc.
Seattle, Wash.

Editor, WESTERN INDUSTRY:

This is a belated thank you for your story and picture of our new airplane in the January issue. We were very surprised to see this as we had sent the publicity out only to aviation magazines. And we appreciate the space your magazine gave us.

We are continually getting inquiries about this new air-

plane, and it is difficult to determine whether any of these were caused specifically by the mention in WESTERN INDUSTRY. You gave us a very nice play however, and I am sure we will get some benefit from it now or in the future.

ROBERT N. WARD
Sales and Promotion, Central Aircraft Inc.
Yakima, Wash.

Editor, WESTERN INDUSTRY:

You are to be congratulated for the fine editorial matter contained in your Sixth Annual Review and Forecast of industrial developments and trends published in the January issue of WESTERN INDUSTRY. Please accept the thanks of the Pacific Coast Group of the American Die Casting Institute for including our industry in your roundup.

R. R. DREIBUS
Chairman, Pacific Coast Group
American Die Casting Institute, Inc.
c/o Harvill Corp., Los Angeles

Editor, WESTERN INDUSTRY:

I have found the articles in your January issue most interesting. As I think you know, I share your general enthusiasm for the West and the opportunities which exist for growth of industry in the West.

I. W. WILSON
President, Aluminum Co. of America
Pittsburgh, Pa.

Editor, WESTERN INDUSTRY:

Your annual Review and Forecast number has been passed around to all of our key employees, and it is amazing to note the growth of *Western Industry*, both as a magazine and also as to its subject matter.

ROBERT M. McINTOSH
Vice President and Director of Sales
Hallett Manufacturing Co.
Inglewood, Calif.

Correction on gas figures

Editor, WESTERN INDUSTRY:

Your treatment of the subject of natural gas for the Pacific Northwest was extremely well done.

I would like to call your attention to one slight error, in order that you may have a ready answer if someone questions the data. Our company would distribute 38% of the gas which the pipeline would sell to utilities and about 25% of the total pipeline gas; therefore, your statement that we would distribute "38% of the line's gas" is slightly inaccurate.

JAMES F. BELL
Vice President, Portland Gas & Coke Co.
Portland, Ore.

Re-request for name

Editor, WESTERN INDUSTRY:

As showing how thoroughly we read *Western Industry*, today we noted in the December 1953 issue, on page 22, under "Letters," that a Mr. McFarland, of Sandpoint, Idaho, had written in asking for the name and address of the author of the article in your September 1953 issue, entitled "Another Extract from Wood." In that article he was telling about Arabogalactan.

We, too, would like to have this gentleman's name and address, and are enclosing herewith a stamped, addressed envelope for your convenience in furnishing us this information.

LEROY STANTON, JR.,
E. J. Stanton & Son, Inc.
Los Angeles

CALENDAR OF MEETINGS

MAR. 23-25—*San Francisco Sales Executives Assn. Sales Builders Clinic.* Scottish Rite Auditorium, San Francisco. Contact association office, 625 Market St. EX 2-5577.

MAR. 25-27—*Pacific Coast Paint & Varnish Assn.*, regional meeting, San Francisco. Contact R. P. Weber, W. P. Fuller Co., South San Francisco, Calif.

MAR. 25-27—*Intermountain Logging Conference*, regional, Davenport Hotel, Spokane, Wash. Contact C. P. Keim, secy.-mgr., 215 Buffalo Bldg., Kalispell, Mont.

MAR. 26—*Quality Control Conference*, Cubberly Auditorium, Stanford U. Sponsored by Committee on Industrial Engineering, Stanford, in cooperation with Bay Area section, American Society for Quality Control. Contact G. Ireson, Stanford U., Calif.

MAR. 31—*Northwest Public Power Assn.*, regional meeting, Tacoma, Wash. Contact F. Ward, Tacoma, BR. 3141.

APR. 1-3—*Electrical Maintenance Engineers Assn. of Southern Calif.*, annual electrical industry show, Shrine Exposition Hall, Los Angeles. Contact J. J. Singleton, 816 W. Fifth St., L. A. 17.

APR. 2-3—*Pacific Northwest Conference on Quality Control*, U. of Washington, Seattle. Contact N. W. Steele, Jr., 701 N. 100th St.

APR. 11-13—*Pacific Northwest Trade Assn.* general conference, Multnomah Hotel, Portland, Ore. Contact D. C. Knapp, executive secretary, PNTA, 1217-1218 Joseph Vance Bldg., Seattle 1, Wash.

APR. 19-20—*Illuminating Engineering Society*, regional meeting, San Francisco. Contact J. S. Walsh, general chairman, P. G. & E., 245 Market St., S. F.

APR. 19-20—*Symposium on Automatic Production of Electronic Equipment*, Fairmont Hotel, San Francisco. Sponsored by Stanford Research Institute and United States Air Force. Contact L. K. Lee, Advanced Techniques Group, Engineering Division, SRI, Stanford, Calif.

APR. 23-24—*Liquid Gas Dealers Association (of Calif.)*, state meeting in San Francisco. Contact Jack A. Douglas, Rt. 2, Box 200, Woodland, Calif.

APR. 27-28—*Northwest Wood Products Clinic.* Hotel Davenport, Spokane. Contact R. O. Batdorf, Box 684, Spokane, Wash.

APR. 29-30—*California Fertilizer Conference.* Moose Hall, Visalia, Calif. Contact C. F. Association, 475 Huntington Drive, San Marino 9, Calif.

APR. 29-May 1—*AIME Pacific Northwest Metals & Minerals Conference*, Portland, Ore. Contact F. X. Cappa, conference chairman, Box 120, Vancouver, Wash.

MAY 10-11—*National Lumbermen's Assn.*, national meeting, Davenport Hotel, Spokane, Wash. Contact E. C. Olson.

Where do the old timers go?

If they are the "old time" mold and die makers, they have probably gone to Phoenix, Arizona to enjoy retirement in the wonderful Phoenix climate. And chances are that after a few months of fun-in-the-sun, they are anxious to get back to work and turn their hands once again to their old skills.

That's why Phoenix is today one of the great centers of skilled mold and die makers — men who are still able to turn out a full day of careful and exacting work — men who take justified pride in the skills they've acquired in a lifetime of work and experience.

That's why Phoenix was selected as the site of operations for BEE Mold and Die, Inc. — custom-manufacturers of molds and dies. For BEE knows that only the superior abilities of these experienced craftsmen can produce the perfectly made molds and dies that you demand.

MEETING INDUSTRY'S NEEDS

BEE Mold and Die, Inc., meets the needs of rubber, plastics and metal casting industries by providing them with a dependable source of molds and dies accurately made to the most exacting specifications.

BEE is devoted exclusively to the custom-manufacturing of molds and dies — their entire effort is devoted to this single task—they do nothing but design and produce molds and dies for you — they have no other interests.

BEE operations are thoroughly integrated and subject to minute control. For example, they even do their own engraving.

BEE provides you with the services of the most modern equipment *plus* the services of capable engineers and skilled craftsmen — you can be assured of guaranteed quality and workmanship in the production of your molds and dies.

Take your next mold or die problem to BEE for fast, dependable and economical service. We ship *F.O.B. your plant.*

Our nation-wide staff is ready to serve you. Write, wire or phone us at Phoenix or at our nearest branch office. We welcome the opportunity to quote on your needs in molds and dies.

Bee

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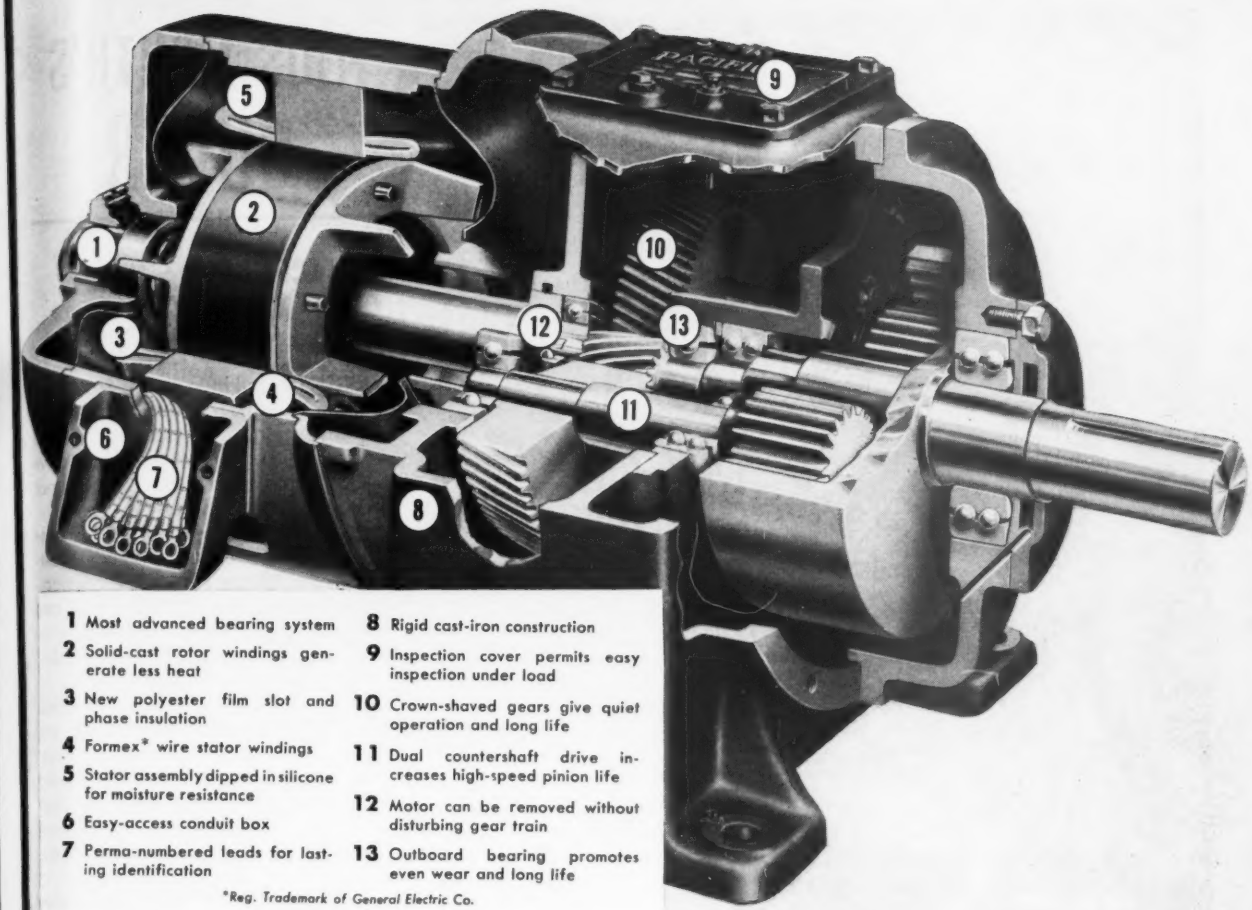


1 Most advanced bearing system
2 Solid-cast rotor windings generate less heat
3 New polyester film slot and phase insulation
4 Formex* wire stator windings
5 Stator assembly dipped in silicone for moisture resistance
6 Easy-access conduit box
7 Perma-numbered leads for lasting identification
8 Rigid cast-iron construction
9 Inspection cover permits easy inspection under load
10 Crown-shaved gears give quiet operation and long life
11 Dual countershaft drive increases high-speed pinion life
12 Motor can be removed without disturbing gear train
13 Outboard bearing promotes even wear and long life

*Reg. Trademark of General Electric Co.

Cutaway view, double-reduction unit. G-E Pacific Gear-motors available in standard ratings 1 to 50 hp, 780 to 13.5 rpm output speed.

Now G-E Pacific Gear-motors are built with the all-new TRI 55 CLAD motor

REG. U.S. PAT. OFF.

The new Tri-Clad '55' motor—leader in modern motor design—is now an integral part of most G-E Pacific Gear-motors 1 to 5 hp. Gear-motors 7½ to 30 hp will be equipped with the new Tri-Clad '55' as higher ratings become available.

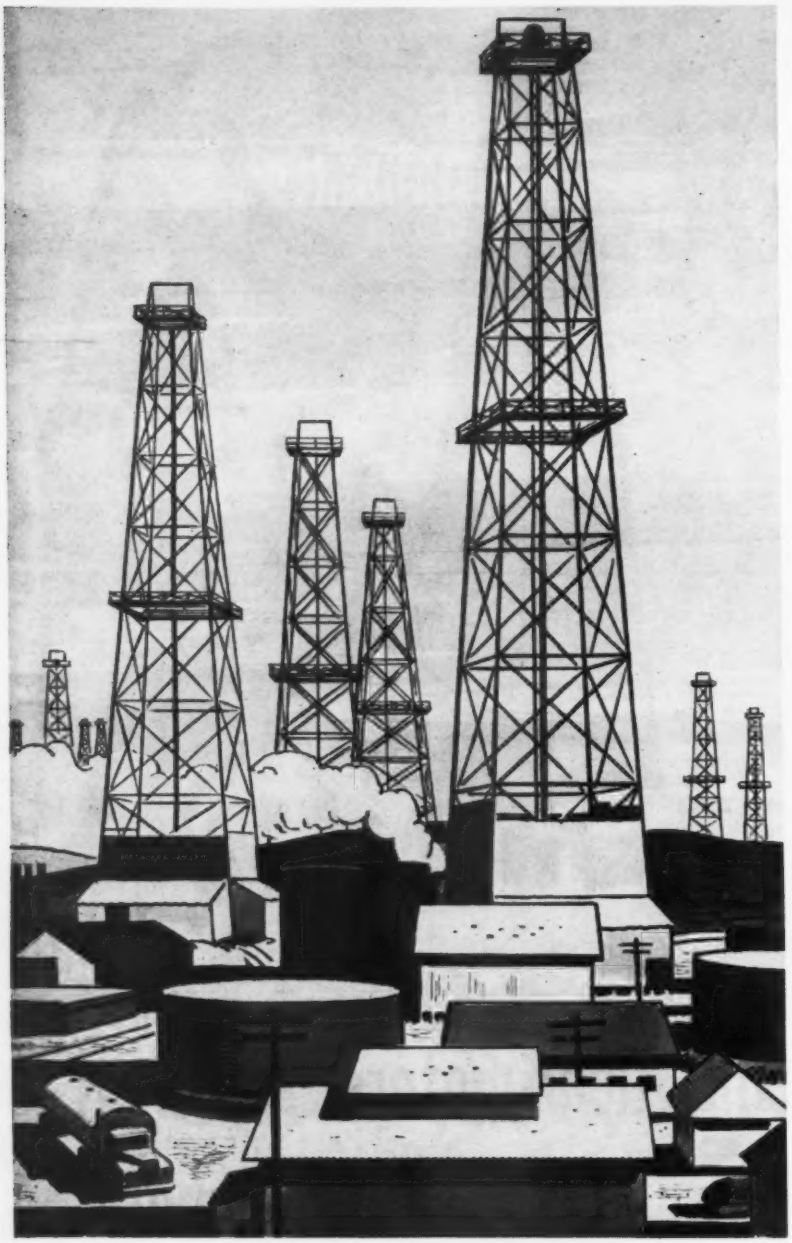
Packing more horsepower per pound and higher full-load speeds in a smaller frame size, this completely new motor makes the G-E Pacific Gear-motor an even more compact, more efficient low-speed drive. Newer, stronger insulation in the Tri-Clad '55' will add years of gear-motor life on the toughest applications. Its more fully enclosed construction makes this dripproof gear-motor suitable for many applications where dripproof enclosures formerly could not be applied.

Take advantage of the very latest advancements in motor design, materials, and manufacture. Specify G-E Pacific Gear-motors built with the new Tri-Clad '55' motor. They're the logical answer to most low-speed drive problems.

For more information about new G-E Pacific Gear-motors contact your nearest Western G-E Apparatus Sales Office, or your Authorized G-E Motor Agent. For descriptive information write to General Electric Co., Section 648-16, Schenectady, N. Y. for your free copy of bulletin GEA-6076.

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

GENERAL ELECTRIC



THIS MONTH'S COVER

CONCRETE CONSTRUCTION grows with the West

SINCE the end of World War II markets and uses of portland cement have rapidly expanded. Broadened uses and new construction techniques have pushed cement to a new importance in the industrial life of the West.

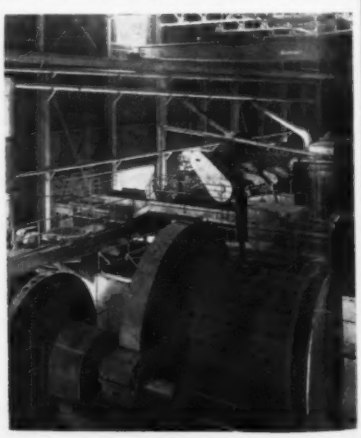
Ideal Cement Company, with plants at seven locations in the eleven Western States, is the West's largest portland cement manufacturer. The two 400 feet long kilns shown on the cover are at Ideal's new Portland, Colo., plant—opened in 1948.

Western builders, anxious to break away from conventional forms, are finding architectural concrete adaptable and flexible. They were among the first to use it extensively. The high earthquake resistance of reinforced concrete led to its wide and early use on the Pacific Coast.

With the development of fast, new, economical methods of construction—precast, prestressed, tilt up, lift slab and other new techniques—concrete will continue to play a key role in industrial progress.

Many engineers believe concrete the best answer to the problem of providing low-cost housing for American families. Add to this the uses of concrete in farm construction, airport runways, highways, defense construction, sanitary facilities, aqueducts, flood control and irrigation.

BALL MILLS crush cement from the kilns into the finished powder prior to sacking.



Offices in 70 Cities throughout the U.S.A.

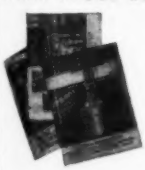
Shippers have many reasons for favoring Union Pacific service. One of these is the friendly, cooperative spirit of Union Pacific employees. This is in evidence everywhere. Doesn't it follow that such friendly cooperation means finer, more dependable service? Remember this the next time you have shipments to or from California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, Oregon, Utah, Washington or Wyoming.

UNION PACIFIC RAILROAD

L-S facts about fork trucks

8 tips on how to buy a Fork Truck

1. Get Proof of Dependability

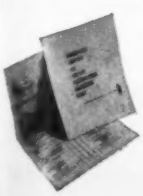


See how others have shaved costs, improved efficiency. Ask for a demonstration or send for Lewis-Shepard case history "Proof Folders".

2. Compare Gas & Electric Trucks

"Gas vs. Electric Folder" gives facts about power, maintenance, depreciation cost. Shows you a digest of others' experience.

3. Compare Competitive Trucks



"Comparison Charts" let you check features of all makes. See for yourself the superiority of Lewis-Shepard Trucks.

4. Compare Operating Costs

Check L-S against any other truck. "Maintenance Report Forms" make it easy to keep track of your operating costs.

5. Choose from a Broad Line

Whatever your needs, an intelligent application can be made from L-S Catalogs—showing the most complete line of trucks available.

6. Consider Attachments

Attachments can multiply your fork truck's flexibility. L-S "Attachment Folders" give detailed information.

7. Know the Manufacturer and his Local Facilities

Check his business reputation and the extent of his service organization in your area. The local L-S man is listed in your Yellow Pages.

8. Above All, Know the Reputation of the Product

Here's one measure:

Listed are a few of the "blue-chip" companies* who have recently reordered L-S Electric Trucks.

Glass Mfg. Co.	22 L-S in use—reordered	9
Elec. Mach. Mfr.	297 L-S in use—reordered	35
Motor Car Co.	45 L-S in use—reordered	5
Retail Store	106 L-S in use—reordered	10
Rubber Co.	28 L-S in use—reordered	6

**Names on request*

LEWIS-SHEPARD

1042-3 Walnut St., Watertown 72, Mass.

The "MASTER" Line

Please send me information on 1 2 3 4 5 6 7 8.
(*Circle items from above Buying Tips*)

Name..... Title.....

Company.....

Address.....

City..... State.....

Do You Use Steel?

Here is a buyers' check list of interest

Steel has been in such short supply for so many years that there has been a tendency toward lower standards. With the situation now reversed, it may be well to raise our sights and give the production or fabricating departments a break.

With this in mind the following check list may be worth consideration.

First, on the character and capacity of the supplier:

- ☐ Is the supplier a good dependable company with a wide range of steels actually in stock so I can take full advantage of quantity differentials and save time in ordering and other office details?
- ☐ Am I establishing a business relationship with a company which will be able and willing to supply me with steel at fair prices next month or next year—even if demand should again exceed supply?
- ☐ Can I return the material if it has not been processed and I find that I can't use it?
- ☐ Can I count on the supplier to settle any reasonable difference of opinion to my satisfaction? Is the supplier customer-minded?
- ☐ Does the supplier have, not only the interest, but also the ability to carry my account in times of national stress or a possible financial difficulty?

Second, concerning the material:

- ☐ Is the steel of known, uniform quality so that I know what can be expected of it and can be sure of getting steel of the same uniform quality next month or next year?
- ☐ Is the steel accurate as to size or gauge so that no time is lost in extra processing? Is scrap minimized or eliminated?
- ☐ Is the steel in good condition? Has it been carefully stored, handled and shipped so that it will arrive ready for use?

Third, concerning the service:

- ☐ Can I depend on clean accurate cutting so that the steel will be immediately available for use without further cutting or preparation?
- ☐ Can I be sure of correct weight?
- ☐ Will the steel be delivered when promised so I will get it when I need it, even on very short notice?

No source is perfect, and we certainly do not pose as such. However, we have been serving industry—with good sound steel from stock at fair prices for over one hundred years. And we have been working with our customers in many other ways from helping with finances to solving problems of fabrication and inventory control.

We stand ready to serve you well whenever you call.

JOSEPH T. RYERSON & SON, Inc.

Western Industry

MARCH 1954

A SMALL PLANT DOES IT . . .

- *proves exact labor costs*
- *gets immediate results*
- *keeps operating status on tap*
- *makes industrial engineering click*

By
MARTIN S. MEYERS
Chief Industrial Engineer
Baby Line Furniture Co.
Los Angeles, Calif.

RECENTLY, a manufacturer friend of mine was relating his difficulties in establishing the actual costs of his products.

Seemingly, he had allowed sufficient labor dollars in his sales price, but his accountant was now reporting a loss on labor. When I asked what basis he had used in predetermining his labor costs, he went into a long history of his 20 years as a manufacturer and his vast experience.

Finally, after he had exhausted the record, I suggested it would be to his advantage to hire an industrial engineer to make time studies and tell him on a scientific basis what his labor costs should be. His answer was a very revealing one and indicates a growing tendency to feel that the industrial engineer today is a theorist and a luxury. His answer was: "I know I should, and I want to. As a matter of fact, I have tried several, but they're all over my head. I can't understand them."

Rapport required

Much of this is the fault of the practicing industrial engineers, and much of it is the responsibility of the university professors. Neither group has ever taken the time to explain to management what may be expected. If no measure of success is established, who is to say that a program has failed? Or more important: how is the engineer to know if he has succeeded?

Perhaps for this reason more than any other, the industrial engineer in small industry is not considered a success.

At the same time, it must be admitted that the tendency of the industrial engineer is to start on too high a level for small plant management. It is time that we stopped getting ahead of ourselves if we are to benefit the small plant. We must act in terms of what is practical today, and think in terms of plans for tomorrow—not proceed with future developments before we have utilized the tools available today.

This is the basic difference between the application of industrial engineering in large industry and in small plants. The principles are the same, but the application and the responsibilities are different.

In a large operation, management is willing and can afford to invest for future returns, but small plants have small budgets and must make each dollar pay for itself. The industrial engineer, by the same reasoning, must show results today; he cannot wait for tomorrow.

Expectation formula

Perhaps a simple way to express what management today expects from the industrial engineer is simply: "Give management lower costs—thereby implying more profits—with less headaches."

Greater profits alone are no longer enough. The desire on the part of ownership to have high profits regardless of the physical and moral consequences is obsolete. Progressive ownership, or management, is evidenced by a smooth-flowing operation; and by a normal ratio of profit. And this is where the industrial engineer can prove his value.

The first thing, and probably the

hardest, for an industrial engineer to realize when he enters a new and small organization, is that he must first record what is happening—not try to change what he sees.

Management's first request is: "Tell me later how it should be done; right now tell how it is being done."

It is not only important that the industrial engineer know what is expected of him, but what is expected of each member of the organization as well.

Very few small plants have a written organization chart. It thereby becomes important that the engineer establish one with adequate descriptions of what each person and function is today, not what it should be according to the textbook.

Owner needs to know

The small plant owner does not want a "young upstart" (regardless of his age) to come in and immediately start to tell him how to run his business. Further, the small plant owner wants to understand every move that every man in his organization makes so he can evaluate it. It is a general conception that understanding is an indication of success, and rightfully so.

At Baby Line, our organization chart is a very simple one and divides the staff functions among five division heads: the sales manager, who is also responsible for the inside order desk, and all outside warehouses; the engineering and inspection manager; the production manager and plant superintendent, who is responsible directly for production and plant maintenance; the purchasing agent, who is also responsible for the receiving and stores departments; and the industrial engineer, who is also responsible for the personnel department and the factory cost accounting functions.

In establishing the organization chart, it is also important that the lines of communication be delineated and that each line officer be aware of the reports he is to make, when he is to make them, and to whom.

At Baby Line, every foreman turns in a production report to the production manager, who in turn gives it to the industrial engineer. Where a product assumes an identity, it is reported as such. This first occurs in the assembly department. Prior to this department, the mill room reports the operations completed each day by means of the individual worker's daily production report, and the cutting department foreman reports the amount of lumber placed into production and the amount of recovery effected.

From the reports of the assembly department, the upfitting department, and the shipping department, the industrial engineer prepares a "Daily Report of Production vs. Shipments," as shown. Department No. 7 is the assembly department, where the product first assumes the identity of being either a crib, high chair, case piece or play yard.

The dollar value is dollars at sales price in every instance. From this report, which is placed on the desks of top management each day, it is easy to cite the comparison of sales to production and to see the rise and fall in finished goods inventory.

A second report made from the same information is designed to give the comparison of labor efficiency where time standards have yet to be established. This second report is used only to give small plant managements the immediate answers they require, when they do not have the patience to wait until labor standards are established by time study or by any method of synthetic standards. It is strictly an interim report.

Payroll report

In addition to the information received from the various production departments, the industrial engineer receives a report each payroll period from the payroll department which shows the number of hours and the amount of payroll dollars expended. Thus, with this information, the engineer can give to management a report showing the dollars of payroll in each department as a percentage of production at sales value, and as a percentage of actual shipments in sales dollar. The same report can cite the increases and decreases in these percentages each period.

While this type of report can be considered contrary to all good standards of industrial engineering, it nevertheless enables management to get the facts immediately.

If the program is to succeed, the industrial engineer must establish a measure by which to establish conditions as they currently exist; and the dollar is the easiest ruler by which a small plant owner can measure his success.

Actually, speaking of rulers, we only know that the term "inch" was set to indicate a certain amount of distance. As long as it is accepted by everyone as being the same, then it becomes a

JOB ROUTING CARD

STYLE #	ARTICLE	PART #	PART NAME	QUAN EACH

JOB #	QUAN.	NOTES	Parts Reqd	JOB #	QUAN.	NOTES	Parts Reqd

SPECIAL INSTRUCTIONS:

ROUGH DIMENSIONS			NET DIMENSIONS				MATERIAL
THICK	WIDE	LONG	THICK	WIDE	LONG	B.S.	

Sqnce.	Oprn. #	DESCRIPTION OF WORK	STD. TIME per 100

DAILY REPORTS and a job routing card are important tools relied upon to maintain smooth operation at Baby Line. Above all they must be timely and readily understandable by management.

DAILY REPORT of ACTUAL VERSUS STANDARD HOURS in DEPT. #____
MONTH OF _____, 1953

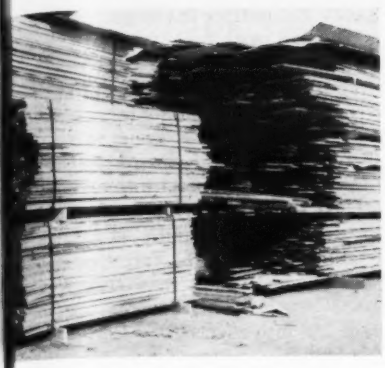
DATE	CRIBS		CASES		CHAIRS		YARDS		MISC REF.	TOTAL		TRANSFERS		PAYROLL HOURS
	ACT'L	STD.	ACT'L	STD.	ACT'L	STD.	ACT'L	STD.		ACT'L	STD.	IN	OUT	

DAILY SHOP EFFICIENCY REPORT FOR WEEK ENDING _____ 19__

		MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	TOTAL
DEPT. # 1	STD.						
	% OF ACT.						

DAILY RECORD OF PRODUCTION VERSUS SHIPMENTS FOR MONTH OF

DATE	PRODUCTION COMPLETED in DEPT. # 17				PRODUCTION COMPLETED for SHIPMENT				MERCHANDISE SHIPPED				BALANCE on HAND	
	NUMBER of PIECES		DOLLAR VALUE		NUMBER of PIECES		DOLLAR VALUE		NUMBER of PIECES		DOLLAR VALUE			
	TODAY	TO DATE	TODAY	TO DATE	TODAY	TO DATE	TODAY	TO DATE	BILING	TO DATE	TODAY	TO DATE	PIECES	VALUE



LEFT: Lumber was formerly stacked by hand one board at a time. Now it comes banded and stacked on pallets. Handling time is cut from four days to five hours.

RIGHT: A conveyor belt used to replace the off-bearer at a moulder lies in the foreground. Behind the operator is a truck divided into four sections, three used for raw material and the fourth for machined parts as they come from the machine.

standard measure. Today, the dollar is accepted by everyone as being the same, so the industrial engineer can use it until his time studies are taken.

Another form which we use at Baby Line is the "Job Routing Card" as shown. This card is placed in a plastic envelope and moves with the parts through the mill room in the shop. Each machine in the shop has been given an operation number according to an over-all plan, and the machine to be used for a particular operation is indicated on the routing card by this number. On the extreme right hand side of the card there is provision for the standard machine time expressed in time per hundred pieces.

The top of the card has been designed so that it can be used for eight different jobs through the shop. This was done to save making new cards for each production run of the same style number. The "Notes" column in this area is used to advise the production worker of the standard time for the number of parts required for the particular job number.

When all operations are complete, the load is transferred to the assembly department. The foreman of this department is responsible for checking the number of pieces on the load against the number of parts required, and then returning the routing card to the industrial engineer's office.

It is surprising that many small shops do not have these basic routing cards. In all too many shops, the management is completely dependent upon the foremen to determine how a part is to be made, and then to tell the individual machine operators orally about it. More important, the routing cards are the basis upon which the time standards are set, and the basis upon which the standard cost of the product is established.

The parts routing card is another of the first and basic steps that must be established by an industrial engineer in small plants.

Another item of great importance to small plant management is a written completion schedule. All too often, the sales manager or order desk will be forced to ask the owner, the plant manager, the foreman or anyone else when a certain item will be ready for shipment.

This completion schedule should not be an elaborate chart and should not even list dates when first issued. The first step is to get the proper sequence established; then add tentative dates. After time study data are established, it is possible to proceed with standard completion schedules.

Much of the early success of the written assembly schedule in many plants is due to the fact that the foremen of the individual departments felt they were an important part of the thinking that went into establishing the dates. In other words, the industrial engineer reported the facts as given to him. Later, the principles of standard data were explained and used.

The first responsibility of the industrial engineer is to establish written records of what is happening in the organization when he first joins it. But it is not my intention to minimize the importance of the long-range program of proper organization, of proper time standards and of proper scheduling. These are all very important, but they will not come until management has gained confidence in the program.

Staff meetings

If the industrial engineering program is properly organized, staff meetings will be held to discuss problems of each division individually. This is necessary even if the staff consists of two or three men. Meetings are important to properly air gripes and to exchange ideas. During these meetings, the subject of organization is injected to the point where each man realizes what work he has been doing that could be performed more adequately—notice that the word "efficiently" is not used in suggesting changes—by another man in the organization.

The direct result of these meetings is a good organization chart where each man knows what he should do—not what he has been doing—for the over-all benefit of the company rather than according to his individual personality and desires.

Thus, the industrial engineer has started on the second phase of his work: to record for management what should be happening. In so doing, the engineer must always remember that he can be pointed to as an extreme egotist. His job requires him to believe that he can accomplish the job better than anyone else, but it is dangerous to show this to the point that others can resent it.

Time study most used

In recording for management what should be happening, the tool most often used by the industrial engineer is time study. As fast as the new standards based on current methods are set, the previous reports to management on labor efficiency using the dollar as the measure are changed to reflect the new basis for comparing actual to standard, as shown on a "Daily Shop Efficiency Report." This is a simple report and lists for top management the actual hours spent in each department each day of the week.

In this report, the standard hours of work produced is also shown and then expressed as a per cent of the actual. As long as this percentage is 100% or better, management knows there is a profit on labor. But if the figure is below 100, then there is a loss on labor.

This particular form, with the above description, is used when standard labor is in cost hours rather than standard production hours. Standard production hours means the amount of work that should be performed; cost hours is the same standard but modified by the operating efficiency of the shop. Many small plants are showing a loss on labor in their operating statements because they are using standard

CONVEYOR belt carrying packaged labeled goods is usable for its entire length. There is no return belt underneath.

production hours in computing sales prices, rather than using cost hours.

A more detailed report of the same information is the "Daily Report of Actual vs. Standard Hours" which shows the actual hours and actual units of production in the particular department according to the product line, as a comparison to the standard hours of work performed.

This report not only serves to show the efficiency of the department but is used by the factory cost office for recording actual costs and labor variances on the month-end operating statement. Thus, due to the necessities of small plant operation, a single report is used for multiple purpose to give better control of the operation with a minimum of expense.

By the time that the industrial engineer has made time studies in sufficient number to make these reports he is also sufficiently familiar with the product, with the materials, with the machines, and with the men to be able to discuss their problems on a common ground—no longer as a newcomer or stranger to the organization.

Third part of program

And that is the start of the third phase of the industrial engineering program: suggest changes to improve the standards already established. Here again, it is important that the engineer express himself in terms of what could be done to make the standards show less man hours or more efficient operation. The entire approach is that he is concerned with his job and not with telling the other man what to do.

Unfortunately, some of the more idealistic industrial engineers are inclined to believe that foremen, production managers and plant owners are going to welcome them with open arms to come in and show them how to do their jobs better. Maybe in some shops this is true, but I don't believe I would enjoy working in them. I cannot believe that any man with any ability who is in a responsible position will welcome anyone coming in to tell him in effect how bad a job he is doing. All of us feel that what we are doing is good—not perfect, but at least good enough to warrant an occasional pat on the back.

And remember, in everyone there is a feeling of wanting to help the other fellow. I cannot tell you how often I have used the trick of showing someone where I needed help on an idea I had in order to get him to change what he was doing.

A good illustration of changes made is the photo of the conveyor belt designed and built at the plant under the supervision of our plant superintendent, Lloyd Cullen. This belt is approximately 600 feet long, making a complete circle of the second floor of the shipping department, in addition to going down to the first floor and back up again.

While the photo does not show too well, it can be seen that there is no return belt underneath. The belt is 100% usable surface at all times. To our knowledge there is no similar installation on the West Coast.

In the same photo can be seen our method of finished goods inventory control through an identification card on each package entering the warehouse.

Another photo shows a conveyor belt used to replace the off-bearer at a moulder. In the background can be seen another development to save floor space. The truck shown is divided into four sections but only three of the areas are used for raw material. The fourth is used to place the machined parts as they come from the machine. This was developed due to the constant complaint that machine operators could not find empty factory trucks and were constantly away from their machines.

In the final analysis, there is a saying very often repeated: "Having ideas is easy, but putting the ideas into effect takes hard work."

Management should expect reports from the industrial engineer for methods improvements and for other betterments. But, at the same time, he should expect the industrial engineer to conduct himself and to prepare his reports so that they will be used, not just read. More bluntly stated, the final evaluation of the industrial engineer to small plant management is: "How much of his program can he have put into effect?"

Tact a facet

On the other hand, it is equally important that the industrial engineer does not find himself becoming a line officer doing the work, instead of a staff officer recommending the improvements. Tact is important at that point—as is the organization chart showing who is responsible for doing the line function.

To summarize: what are some of the things that small plant management can expect as an ultimate result of having an industrial engineer on the staff?

1. Adequate time standards to establish costs and to establish operating efficiency.
2. Current daily information on operating efficiency.
3. Constant methods improvements based on new ideas and equipment as well as plant layout reflecting lower time standards.
4. Proper production planning as evidenced by schedules that can be relied upon.
5. Not previously mentioned, but equally important, quality control.
6. Budgetary control of factory overhead.

And certainly many other intangible benefits that warrant the "less headaches" phrase.

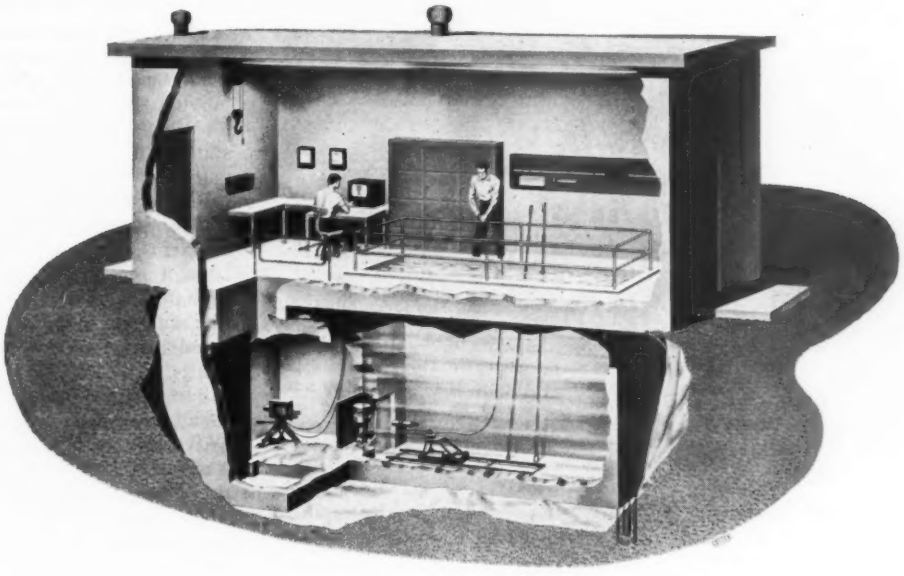
But to obtain all this, management is equally important, although the industrial engineer can ask but little. Primarily, give him cooperation, adequate tools, and opportunity for advancement and recognition with tangible indications of faith. Don't be like one company owner who voiced his indication of cooperation by saying, "What do you mean, I didn't cooperate with the man? I backed him all the way. Why I even backed him up when I knew he was wrong."

If a man is wrong, tell him he is wrong in a constructive manner. When he is right, show it. When he is justifying his position in the company structure, give him the proper recognition to make him feel that the company is worth the effort being expended.

If management and the industrial engineer are compatible, it is inevitable that the result will be "less headaches and better profits."

THE FOREGOING article was written for *Western Industry* by Mr. Meyers as an adaptation of his paper presented at the 6th annual Industrial Engineering Institute at the University of California on the Berkeley and Los Angeles campuses Jan. 29-Feb. 2. It was prepared with the cooperation of Edward S. Feldman, executive secretary, Furniture Manufacturers Association of Southern California.

ATOM-RUN INDUSTRY will be here before you know it . . .



Locomotives on the drafting board . . . Power plants being worked on . . . Radioactive testing a reality

By DAVID Z. BECKLER, Assistant Director, Office of Industrial Development, U. S. Atomic Energy Commission

First part of two installments

WHAT ABOUT tomorrow's atom? Four principal industrial uses of atomic energy have emerged from our atomic activities of the last decade. They are based on the heat and radiation from nuclear fission, and include nuclear waste fission products and nuclear instuments, including equipment.

Economic summary

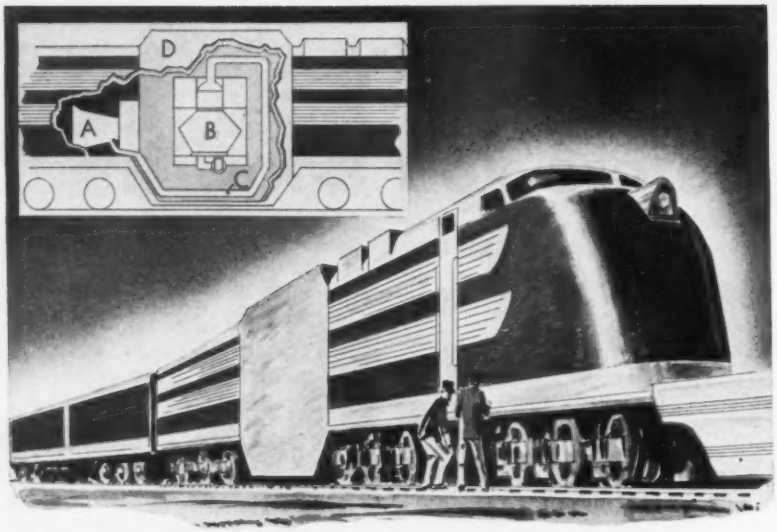
A realistic summary of the present situation regarding economic nuclear power would be as follows: Nuclear power generally competitive with power from conventional power plants is probably technically feasible. It is highly unlikely that the first such plants built on the basis of today's technology could come within a factor of three or more of the present national average generating costs of 7 mills/kw-hr. The "second generation" reactors promise to be nearly competitive. There is some assurance that the third generation reactor-power plants will be competitive, although even then nuclear power will probably not constitute an important percentage of our national generating capacity. Considering it takes about 5 years per reactor generation (this is based on our past experience), it is likely to be ten and possibly fifteen years before economic nuclear power plants will begin operation.

ABOVE: Stanford Research Institute's Radiation Engineering Laboratory with Cobalt 60 source in assembled position for radiographic examination of a complicated metal casting. Gamma rays pass through the window of 3/8-in. aluminum at one end of the pool and activate a phospher-treated screen in the dry room. In the proposed method, a TV camera would pick up the shadow cast on the fluorescing screen and carry the image to a monitoring device on the operating level, where technicians would study the screen for flaws.

I appreciate the vagueness of these "guesstimates." Since we have yet to build our first nuclear reactors producing commercially significant blocks of power, there is little to go on other than pertinent military atomic energy experience and informed opinion.

Industrial interest

How much industrial interest can be generated on this basis? Industry has already invested modest amounts in studying the practicability of nuclear power. In 1951 the Commis-



ATOMIC POWERED locomotive, designed by a University of Utah nuclear physicist, resembles conventional locomotive except for 200-ton block in center which contains the nuclear reactor (B). This heats the water and sends steam through pipe (C) to the turbine (A). Steel block (D) has walls four feet thick to protect crew from radiation. The locomotive, designed by Dr. Lyle B. Borst, is presently the object of engineering studies by The Babcock & Wilcox Co. This firm believing the design sound, is investigating such critical problems as heat transfer and boiler structure. If these studies prove successful, construction will follow.

sion signed study agreements with four industrial teams: the Dow Chemical Co. and the Detroit Edison Co.; the Commonwealth Edison Co. and Public Service Co. of Northern Illinois; the Pacific Gas and Electric Co. and the Bechtel Corp.; the Monsanto Chemical Co. and Union Electric Co. The companies collectively have invested over $1,000,000 in these studies to date. As part of its regular reactor development program, the Commission will conduct programs which result from suggestions of these companies and which are regarded by the Commission as having general interest in the field.

The Dow Chemical-Detroit Edison group has expanded to include 25 associated companies and spent an estimated $1,000,000 during the calendar year 1953. In 1952 the Commission signed a study agreement with an additional group, the Pioneer Service and Engineering Co. and the Foster Wheeler Corp., and in 1953 approved the addition of the Diamond Alkali Co. as a partner in this group. Also, in 1953 agreements were signed with Duquesne Light Co.-Walter Kidde Nuclear Laboratories and the Newport News Shipbuilding and Dry Dock Co.; and the Commission approved a regrouping of four of the original companies plus American Gas and Electric Co. to form a new team (Commonwealth Edison-Public Service Corp., Union Electric Co., Pacific Gas and Electric Co., and Bechtel Corp.).

Dual purpose reactors

All of the original study teams have reported that reactors producing both plutonium and power (dual purpose reactors) are technically feasible and could be operated in such a fashion that the plutonium credit would reduce the cost of the power. Although the companies emphasized the value of the weapons-grade plutonium produced in reducing the power costs, it must be kept in mind that the terms of the study agreements emphasized dual purpose reactors. Consequently, the designs settled on in their first reports are not necessarily those which would have been selected had the studies been directed toward power-only reactors with the plutonium produced having but fuel value.

Another factor affecting the economics of nuclear power plants, which is only partially related to technology, is the matter of reactor safety and location.

Safety influences cost

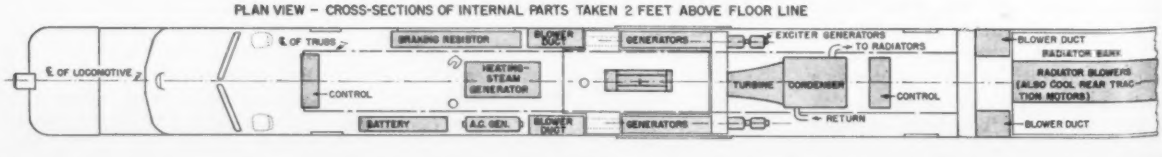
The safety regulations followed by the Commission on power reactors will influence the cost of real estate to provide the necessary exclusion area for an industrial atomic power plant and could materially affect the economics of the plant. This problem is being considered by the AEC's Industrial Committee on Reactor Location Problems. It is interesting to quote from a recent press release by the Commission concerning habitation in the Wahluke Slope area which is located near the Hanford production plants.

The Commission announced that it would release from restriction about 87,000 acres at the extreme east and west ends of the Wahluke Slope across the Columbia River from Hanford. It emphasized that its action does not mean that all risk to life and property in the released lands has been eliminated. The public announcement indicated that the danger in operation of the Hanford plant exists in the remote possibility that one or more of the nuclear chain reacting piles in which plutonium is produced may go out of control, that if any of these reactors ever goes completely out of control, and this is highly unlikely, dangerous amounts of radioactivity may be released to the atmosphere. These reactors cannot explode, like an atomic bomb, but under the worst possible conditions they could produce so much heat that the nuclear fuel elements would melt, thus releasing a very dense and highly radioactive cloud—more dangerous than the cloud produced by an atomic explosion.

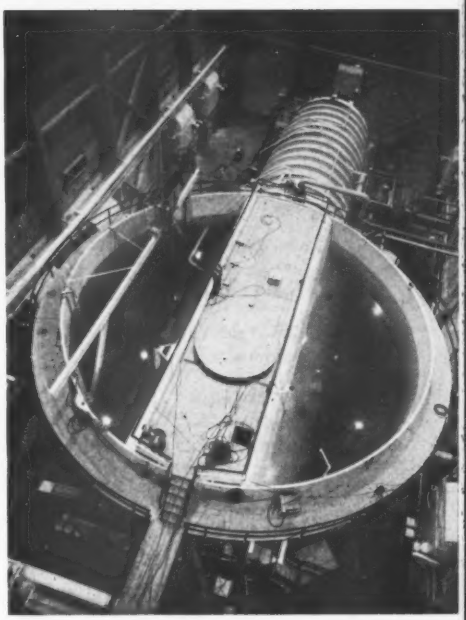
The announcement explained that the chance of a major accident or disaster occurring in one or more of the Hanford piles is small. There are safety devices, both automatic and manual, that are designed to shut the

Layout of proposed atomic-powered locomotive

Scale: Approximately 1/60 actual size (1 cm. = 2 ft.)



THIS NUCLEAR power plant, the Mark I, is a near duplicate of Mark II, which will drive the U. S. S. Nautilus, first atomic submarine. The land-based submarine engine located at the National Reactor Testing Station, Idaho Falls, Idaho, was built by Westinghouse Electric Corp. and installed by Electric Boat Division of General Dynamics Corp. The reactor compartment section of the hull is completely submerged in a tank about 50 ft. in diameter and almost 40 ft. high. The tank's water capacity is around 385,000 gallons.



pile reaction down if it starts to go out of control. Additional safety devices are now being incorporated. But there always remains the small chance that all of these safety devices might fail simultaneously, or simultaneously be put out of commission by natural disaster, such as an earthquake, or by such human action as enemy attack or sabotage.

Population concentration

The Commission's statement concluded that although a certain portion of the Wahluke Slope area could be removed from some safety restrictions, the Commission discouraged any concentration of population, in towns or cities, anywhere within a 25-mile radius of the Hanford production area on the basis that such concentrations would inevitably make evacuation a harder task and would also increase the magnitude of any calamity that might result from a failure in the warning of evacuation plans.

In commenting at such great length on the reactor location problem, its importance in the industrial atomic power picture has probably been overemphasized, since a single industrial reactor will probably constitute much less potential hazard than Hanford. Reasonable and practical means can presumably be found for taking care of the industrial power plant situation. For example, the Dow Chemical-Detroit Edison study group in a statement issued July 14, 1952, mentioned an interesting possibility for providing the necessary exclusion area for a reactor of early design by locating the reactor and appurtenances on a barge or a ship. This would permit construction in a shipyard, and this, Dow believed, would simplify security requirements and would require a minimum of new construction facilities.

Cooperation needed

A sober analysis of the facts and opinions on nuclear power leads to the inevitable conclusion that its continuous development entails a cooperative venture between industry and government. The initiative is first with the government to clear away the legislative barriers that now prevent private ownership and operation of nuclear reactors—a prerequisite to private investment. The government has the job of making available to industry sufficient technological data to enable industrial development. There will also be a need to continue research and development arrangements with private industry where unique governmental facilities are found to a requirement.

It will be industry's job to accept the development burden as quickly as its financial and technical resources permit. The growing enthusiasm on the part of private companies leads me to believe that they will accept this job.

AEC's proposal

With this in mind, the Atomic Energy Commission recently announced a policy designed to further encourage the participation of private industry. It proposed:

a. Interim legislation to permit ownership and operation of nuclear power facilities by groups other than the Commission.

b. Interim legislation to permit lease or sale of fissionable material under safeguards adequate to assure national security.

c. Interim legislation which would permit owners of reactors to use and transfer fissionable and by-product materials not purchased by the Commission, subject to regulation by the Commission in the interest of security and public safety.

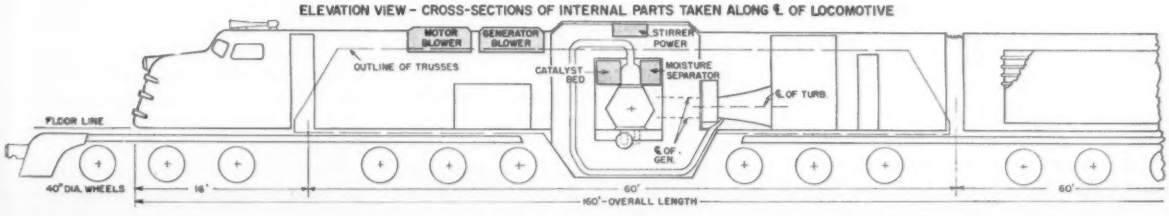
d. The performance of such research and development work in Commission laboratories, relevant to specific power projects, as the Commission deems warranted in the national interest.

e. More liberal patent rights than are presently granted to outside groups, as may seem appropriate to the Commission.

f. Consideration of a progressively adjusted code for safety and exclusion area requirements as may appear reasonable in the light of operational experience with reactors. Competent state authorities will be encouraged to assume increasing responsibility for safety aspects of reactor operation. Financial responsibility associated with reactor operation will be assigned to the owners, in keeping with normal industrial practice.

g. Giving full recognition to the importance of reactor technology to our national security, a progressively liberalized information policy in the power reactor field as increasing activity justifies.

Steps have already been taken to realize the objectives of this statement of policy. On October 22, 1953, AEC Commissioner Thomas E. Murray announced that the Commission has embarked on a program to construct a full-scale power reactor. It will produce a minimum of 60,000 kilowatts of electrical energy, with good possibilities of much higher output.



IS IT A REAL THREAT?

Here are collected reactions to Western Industry's December article— "Branch Plant Economy . . . The West's Doom?"

The challenge

"BRANCH PLANT ECONOMY . . . THE WEST'S DOOM?" appearing in the December 1953 issue of *Western Industry* posed some challenging questions to Western capital: "Has the West no better destiny than to become a branch plant economy? . . . Are we only the tail of an Eastern kite? . . . Must the growth of each industry in the West stand still until an Eastern concern decides that the Western market is big enough to be served by a branch plant?"

Joseph J. Jacobs of Jacobs Engineering Co., Los Angeles, speaking of the chemical industry, said, "If technical and marketing men would raise their sights above the local level and look to national markets, and if there was a source of 'educated money' in the West, the prospects for a Western chemical industry would be bright."

"Educated money" can be the key to developing industries capable of serving not only the West but the rest of the country and foreign countries as well. If underfinanced home-grown industry can gain the sympathetic ear of available Western capital, it will flourish.

* * *

Feeling that the threat of becoming "a branch plant economy" was a real challenge to Western businessmen, the editors of *Western Industry* sent copies of the article to a number of interested and informed parties, asking for their comments. Here are the replies that have been received:

Western plants coming right along. Some may die on the vine but many should do all right for themselves.

Stuart P. Walsh, Director, Industrial Survey Associates, San Francisco:

I AM NOT familiar enough with the chemical industries to know whether Mr. Jacobs is right when he says that Eastern companies "wait until the last moment" before establishing Western plants, or when he says that the oil companies "are not chemically educated"—but in the light of competitive conditions I should be somewhat inclined to question the general validity of both statements.

As to other industrial fields, it is possibly true that Eastern capital is more "educated" than local capital in regard to Western industrial potentials. This may be due to the relatively more evident opportunities in residential and commercial projects, as well as the relative newness of the diversified manufacturing activities of the West.

On the other hand, there has been a tremendous expansion of West-owned industries in recent years, and a rapid birth rate of new manufacturing enterprises. At Sonoma, California, a city of less than 3,000 population, I visited a dozen manufacturing plants the other day, all locally-owned and all but one new since World War II. All of these plants bring in raw material from considerable distance; all of them are serving national markets. Also, all of them are growing.

Thousands of such plants are to be found throughout the West, in country towns and in big cities. Many of them are small, and many of them could use more capital, but they are Western ventures, risking Western money and management to exploit new ideas and new potentials. Maybe some of them will sell out to Eastern companies, but a lot of them will not. In total, they insure a substantial future development of home-owned Western industry.

Nevertheless I think Mr. Jacobs has been helpful in emphasizing the continuing need for more local capital to invest in sound industrial projects.

Let's not be too provincial. West benefits by branch plants. East has no monopoly on brains.

F. T. Letchfield, Consulting Engineer and Assistant Vice President, Wells Fargo Bank & Union Trust Co., San Francisco:

THERE HAS ALWAYS been a school of thought that industrial plants which are captives of Eastern capital are bad for Western economy, the theory being that only the payroll and local purchases of raw materials stay in the area and that the profits go East. To me this has always been somewhat of a superficial, or perhaps more accurately speaking, a provincial viewpoint.

In the first place, the more efficiently any particular enterprise is run, the greater its contribution to our general economy and economic health. If, therefore, a particular industrial activity can be carried on as a branch of an Eastern company more efficiently and with sounder financial resources than can be done under local auspices, it is beneficial to the West.

Any profits which flow out of a given area are very small, percentagewise, in

relation to the total turnover of money in the operation of that enterprise; and, third, Western capital which is available for the financing of new ventures need never lack for sound opportunities. These may or may not be in competition with Eastern companies, but the latter certainly have no monopoly on either brains or opportunity.

In short, I have always felt that a free economy, devoid of any restraints (other than for the protection of the public), subsidies or artificial factors of any sort, in the end produces the greatest good for the greatest number.

So we are a branch plant economy!! Plenty of room for everybody. Don't want to discourage Eastern branches.

C. C. Jamison, Assistant Vice President, Manager, Research Department, Security-First National Bank of Los Angeles, Los Angeles:

THERE CAN BE little doubt that California is, to a considerable degree, a "branch plant area." I do not feel that this, in itself, is necessarily a cause for alarm. There is much, however, to be said for locally-sponsored and managed industry. And, as Mr. Jacobs points out, everything possible should be done to provide adequate venture capital for worthy local enterprises. They should be encouraged—and certainly given an even break with branch plants of Eastern companies.

The fact that additional encouragement and assistance for local enterprises seems called for does not imply that the establishment of additional branch plants should be discouraged. Quite the contrary. Both types should be welcomed and assisted in every reasonable way.

Better business and better merchandising is what we need. And better utilization of our human resource.

Ivan Bloch, Industrial Consultant, Ivan Bloch and Assoc., Portland, Oregon:

PRODUCT MANUFACTURING—as contrasted with semi and raw materials production—offers an infinite variety of outlets for ingenuity, for the development of techniques, and for the exercise of good business and merchandizing practices.

In a very large sense, the opportunities for small business—small capital investments, relatively small but flexible payrolls—are compounding rather than fixed and limited. Of extreme importance is that product manufacturing offers a wide vista for youth and energy, and the utilization of skilled workers and technicians. Young people have long been an exportable commodity from the Pacific Northwest; it is time we obtained better utilization of this resource in our midst.

True, Western capital is tight, so let's look to newer fields and new markets where demand does not yet exist.

Gus P. Backman, Secretary, Salt Lake City Chamber of Commerce:

THE ARTICLE, I think, is correct in every way, and I hope may be of some effect in loosening up Western capital to finance Western concerns.

There is one problem, however, that we must always bear in mind and that is that many of the Eastern concerns entering the Western market with industrial plants already have developed a material demand for their product, which places the new corporation attempting to enter the field in an inferior position.

In analyzing the new industrial installations made in and around this territory over the past several years, practically every one of them has been

More on page 52

. . . Yeah! But how about me??? . . . *Letter from a small Western manufacturer*

THE COMPLETE responsibility of setting up the plant, including the raising of capital to start operations, has fallen to my lot and while I have some very wonderful men on the Board, none of them is familiar with the processes of raising equity capital . . .

It seems to me with the wonderful headway we have shown with an established product of good repute, we should not have a great degree of difficulty in interesting capital to set our wheels in motion.

This area offers many advantages, but as pioneers in the industrial field here, there are certain handicaps in getting capital. Lots of money, many wealthy farmers, unlimited cooperation, but not investment minded as pertains to manufacturing. If it were possible to interest a group of industrially minded men away from this section to move into this section, it would be ideal. The possibilities are unlimited and I'm certain additional capital would follow.

Our corporate structure to date is such that it can be molded to fit most any requirements. Our capital to date has been available without promotional fees, the picture is clean, and should interest those with money available.

Second in a series of four articles on human relations

A HIGH WAGE IS NOT ENOUGH . . .

Content employees must enjoy job satisfaction and job security

By W. DON WEIDNER, Management Services, Colorado Springs, Colo.

FIRST OF THIS SERIES dealt with the necessity of being able to understand as well as reprimand wayward employees. The author points out that all individuals desire to be like others but at the same time feel the need to act independently. Since it is impossible to be both dependent on others and independent of them at the same time, emotional conflict arises. Good human relations practices demand an understanding of these conflicts and must endeavor to help others to meet these conflicts squarely.

A SIMPLE SOLUTION to almost all your employee complaints voiced, witnessed or felt is to first ask yourself, "Is this employee experiencing self-importance, self-respect, job satisfaction and job security?" Then probe into the doubtful answers.

The president of a medium-sized midwestern company sought the help of an industrial psychologist recently because he felt the morale of his employees was not what it should be despite all his efforts to the contrary.

After relating the details, the psychologist prescribed the following: The president was told that good morale building, human relations, was looking at his employees, seeing an invisible red neon sign flashing the words "I want to feel important" across each employee's forehead, and acting accordingly.

This was sound, sensible advice, because making others feel important fulfills one of the four basic wants of every human being, on or off the job, regardless of status.

If you, as a supervisor, make a person feel important, he will like you. If he likes you, he will cooperate with you because he wants to do things for you that will make you like him. He will act dependently, and this fulfills one of the two basic emotions discussed in the first article of this series found in the February issue.

There are many ways to make an employee feel important.

An employee's name is important to him. We as supervisors give too little attention to this important matter. Correct pronunciation and spelling of the employee's name, refraining from name familiarities such as "Porky," "Slim," "Greasy," slurring or making light of odd or long names are important things to remember.

An employee feels important if he is accepted on a basis equal to that of his fellow employees doing the same or similar work. Complete fairness in employee dealings up-grades each employee's feeling of importance even if the dealings do not involve him.

Sharing an employee's interests with him makes him feel important. Your interest in his stamp collection, the new garage he is building, his great Dane, his flower garden, give him a sense of others being interested in him, of his importance.

Attention-getting is a very human means of fulfilling the employee's desire to feel important. Attention-getting can cause numerous employee handling problems. Horseplay may be the supervisor's problem with Joe. Actually horseplay by Joe may be his means of drawing his supervisor's attention. If the supervisor made Joe feel important in other ways, the horseplaying no doubt would come to an end.

Mary is not interested in her work. She begins to be tardy and absent; her work slides. A likely reason is, she is not getting the attention she feels she deserves from the supervisor or fellow employees; she feels she is no longer important, so she draws attention to herself in this rather non-acceptable way.

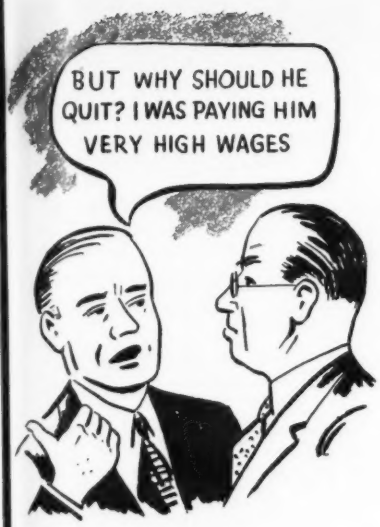
Another way of making an employee feel important is to let him know you respect, not necessarily agree with, his opinions. That, further, you understand, not necessarily agree with, his feelings. He will feel important if you express yourself in a way that conveys to him your respect and understanding of his attitudes. He does not expect you to agree with him.

Respect is basic

Self-respect and the respect of others is the second basic want of all humanity. We all fundamentally want to do a job we can be proud of (self-respect) and a job that will gain for us recognition (respect of others). We do this to fulfill this second basic want. Self-respect is akin to the basic motive to be an individual; respect of others is akin to the basic motive of a desire to be like others, to do the things they approve of.

If your employees are allowed a chance of self-expression or craftsmanship in their jobs, they gain self-respect; they put themselves or their expression in their job. If their job gains the recognition of others, they get respect of others; hence this basic want is fulfilled.

Inability to find self-expression or a challenge in a job creates loss of interest. Loss of interest creates supervisory problems. How, you may say, can the supervisor help an employee find self-expression in a job that is highly repetitive, the same day in and day out? There are many ways: The



supervisor can point out that the employee is top or near-top producer, doing the best quality job, the neatest, that he maintains his equipment best.

Job satisfaction is the third basic want that must be met or fulfilled on the job. Since employees spend one-half of their waking hours on the job, and fundamentally the urge of all mankind is a satisfactory existence, it is important that the employee derive half of all his required satisfaction from his job. A supervisor must help the employee to find satisfaction in doing his job or there exists a vast source of employee problems.

Job satisfaction involves many things to which we ordinarily give insufficient weight. Job satisfaction is increased when the employee understands the connection between what he is doing, his job, and the finished product. Plant tours and product talks by company people are usually helpful in this regard.

Job satisfaction is also increased when the employee understands how the product he helps to make is used in lives of people. Explaining that a small bearing being manufactured is a part of a large steam turbine generating steam for electricity for 55,000 people, and could mean no light or power for these people for eight hours if the bearing was faulty, is an example used by a well-known bearing manufacturer. Job satisfaction is further increased if we like the people we work with, including the supervisor, or the spirit or atmosphere that pervades the department or company, something that is also a part of the supervisor's jurisdiction and under his control. The supervisor's attitude will go far in creating a good working atmosphere for his employees.

The fourth basic want, or rather, a fear, is job security. Without a sense of job security, the employee's mind cannot wholly be directed toward the job. But job security is more than continuous fair play. It involves among other things an opportunity to be upgraded, reasonably comfortable working conditions, the right to complain without fear of reprisal, the chance to participate in changes that directly involve the employee or his job, the opportunity to become acquainted with company and departmental rules and regulations, and the like.

Pay is overstressed

Too much stress is laid on: "Pay the men well and you will have no problems." This is over-simplification. Returning to the facts, you will find that the highest paid crafts, trades, and industries have the poorest work stoppage records.

Remember as supervisors, if we are not interested in our employee's desire for job security, how can we expect the employee to be interested in our productivity?

There are, then, four basic wants that must be met on the job, in a reasonable degree. Fulfillment of one want will not balance a lack of the other three. The supervisor is in a controlling position and for the most part is responsible for a complete lack or occasional absence of any or all these wants. Hence the importance in understanding the fulfillment of basic wants in order to maintain an employee-problem-free department.

Joe was a company man. His foreman, whom he likes, let him train the new help, run the special equipment, and fix simple production stoppages in the anodizing department. Joe and his wife started a few on-the-job informalities like a fresh-baked cake for a midnight snack, off-the-job beach parties, etc. His job was very dirty and dangerous. Pay was average, promotions few if any.

Joe, in two years, was transferred to a line production department because of his good work in the anodizing department. The new job was clean, with better pay and a chance for promotion. He sat all day at his workstation doing one job. His new foreman, although friendly, emphasized production and looked upon his men as work units.

Joe stayed two weeks, then asked to be transferred back to the anodizing department. It was not easy to make this transfer, so he was sold the merits of the new job.

Some time later there was union agitation; Joe became active in it. The union won the election. Joe is now a union officer and a grievance man.

From a human relations point of view, what happened? Joe liked his first job because it gave him recognition, self-respect, self-importance, job satisfaction. His transfer gave him greater job opportunity and more pay, but he was just another worker. He expressed this in his request to return, but no one probed the matter. Instead, they sold him on job opportunity of the new job over his real feelings. Result, he found an out as a person. He found recognition as a part of the union. He is still a good worker, but he is a union man.

IS IT A REAL THREAT?

Comments on "Branch Plant Economy"

. . . Begins on page 48

in this position . . . The new industries to be developed by Western industrialists and Western capital should, in my opinion, look to the newer fields where an established demand for a product does not already exist. One good example of this undertaking is the Utah Wax Company of Salt Lake City with a new project which is being produced by a group of Utah industrialists financed by local capital.

Both you and we have a job of assisting in the development of new uses and new markets for Western products in order to give our Westerners an even break with the Eastern companies financed by Eastern capital.

There's a dearth of large markets here at home. Capital will come to any opportunity to profit.

Miner H. Baker, Assistant Vice President, Economist, Seattle-First National Bank, Seattle:

THIS SUBJECT of lack of capital in the West is one on which I have no firm opinion, since there seems to be no way of proving it one way or the other except citing individual cases.

Mr. Jacobs may be right. On the other hand we do not have, particularly in the Northwest, a large market immediately at hand and there are some financial disadvantages in establishing a plant here to compete nationally. It seems to me that capital is the most mobile of the factors of production and will come here if there is an opportunity for profit. It may be true that potential investors in the West are unsophisticated, but it is a difficult thesis to prove. Perhaps his article will bring forward some evidence pro and con. I hope so, as it is a very important question. You are to be commended for stimulating further inquiry into the subject.

Western businesses lag behind their Eastern brothers. Growing pains partly responsible, but the West is improving.

Stewart M. Lowry, Booz, Allen & Hamilton, Management Consultants, San Francisco:

WHILE Mr. Jacobs raises some very interesting questions, I am unable to develop much serious pessimism with regard to the future economy of the West. My feelings are definitely on the optimistic side. The attraction of Eastern capital to Western enterprises is both a tribute to the shrewdness of the Eastern businessman and a challenge to the Western businessman.

Reluctant as we in the West may be to admit it, there is some evidence that "home grown" Western businesses, many of them still dominated by the founding or second generation, lag somewhat behind the East in their business philosophy. However, I think this inertia is being overcome. The transition of many Western businesses from "small business" to "large business" has been so rapid that the owners have hardly had time to reappraise their management requirements. Meanwhile, Eastern capital may be temporarily more alert to Western opportunities, but I do not believe this will operate to the West's long-range disadvantage.

Don't quote me but . . . more clearly defined objectives for our industrial development are what we need.

From an unnamed reader:

THE ARTICLE by Mr. Jacobs is a very provocative one. Some of his points seem exaggerated but this perhaps can be attributed to the author's enthusiasm for his subject.

However, there are two points which I think deserve some real study by those concerned with Western industrial development. The first is this matter of the "branch plant economy" and the "tail of the Eastern kite." The implication is that this is bad. The author does not prove this point, he simply assumes it. In many instances, branch plants have proved to be a very sound basis of industrial growth. Should we resent them just because they are branch operations? I suspect that this is a provincial attitude.

Which brings me to the second point. I agree that provincialism is a big drawback to industrial development. Have we, however, a clear notion as to which Western attitudes and actions are really provincial? I believe that much of our thinking about economic self-sufficiency and balanced economies is provincial.

The point I am driving at is something which Mr. Jacobs would probably accept; and that is that we need more clearly defined objectives for our industrial development programs. If we knew just what we are trying to accomplish, the validity of Mr. Jacobs' criticisms would be much easier to test. I would like a symposium on that.

TO MAKE HEAVY-DUTY COPPER Gaskets USE REVERE DEOXIDIZED Tube!

Diesel Fuel Injection Pump, made by American Bosch Corp., Springfield, Mass., and gaskets made by cutting rings off 2" deoxidized copper tube.

• An important extra service rendered by Revere consists of collaboration in setting up specifications. This is valuable because there are many different Revere Metals, each with special characteristics. No one copper, for example, will serve to best advantage in every application. A case in point is the matter of copper gaskets for Diesel fuel injection pumps. Copper is of course an ideal metal for gaskets, and is widely used for that purpose. But for this special application, which copper and in what form? The pump is used on large engines for municipal generating plants. It weighs 186 pounds, and must produce the high pressure required to inject fuel near the top of the Diesel compression stroke. Naturally, the load is a pulsating one. American Bosch Corporation came to Revere with the problem. Our suggestion was that much scrap could be saved if the gaskets were made by cutting rings off copper tube, instead of stamping them from strip. This achieved a double purpose, since the tube is made of deoxidized copper, which is superior in this application to electrolytic. We are able to report that these recommendations proved successful.... This work was done by the Revere Technical Advisory Service. To get in touch with it, see the nearest Revere Sales Office.

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METALS AND METALWORKING —special section

Page—San Diego

Parker—Puget Sound

Flanders—Utah

Jones—Pueblo Group

Freeman—Golden Gate

Elder—Columbia Basin

Chalk—Los Angeles

Fergin—Inland Empire

What's ahead for the Metals and Metalworking Industries of the West

In an effort to present a representative cross section of views on the future of metals and metal working in the West, *Western Industry* conducted its yearly survey of Western chapter chairmen of the American Society for Metals, asking each to report on his area. The results of this survey follow.

DESPITE CUTBACKS in steel production nationally, the outlook for metals and metal working in the West is bright. Activity in some areas is returning to a more normal level, but generally there seems to be an expansion of facilities to meet the West's growing industrialization.

Western steel operations will probably be maintained at a rate somewhat higher than that for the remainder of the nation. Western steel production is four and a half times that of 1940, with the eleven Western States using 7,000,000 tons of finished steel products during 1953. Where Western producers supplied only 40% of Western requirements in 1940, they now supply 70%.

In attempting to anticipate future demand, steel makers in the Southern California area are making more specialties every day and are preparing to enlarge their facilities for making high grade alloy steels suitable for aircraft and guided missile applications. The Los Angeles area should lead the country in production of missiles in 1954.

The aircraft industry is still growing and using more and more special steels of high strength and heat resistant nature.

Aircraft

Considerable research and development in the metal field is being conducted at Boeing Aircraft Company. Areas of particular emphasis on current contracts affect titanium, welding processes, sheet metal and forgings, titanium forging and machining and various types of fabrication. The more important problems at present include the need for a better system of jigging for back-up of welds. Some work is also progressing on Mag-Thorium alloys and oven-aged aluminum alloys.

Metal bonding, i.e., corrugation between flat sheets, is now an accepted process and enjoying widespread use, while the search for better heat resisting alloys of the more complex type goes on.

Titanium

Titanium offers tremendous tactical and economic advantages not only for aircraft but for all forms of transportation and for all items which must be transported. It reduces power losses caused by rapidly reciprocating parts, such as pistons and connecting rods, and permits higher peripheral speeds in rotating parts, such as the compressor in jet engines, by reducing the centrifugal force through weight reduction.

However, titanium is very largely restricted to high performance military aircraft and to a few spots in luxury air liners. The reason for this is not a shortage of ore; in fact, titanium is the fourth most prevalent structural metal in the earth's surface. The problem centers around the fact that cost of extracting the metal from the ore by present methods is prohibitive and the difficulties and losses involved in processing, forming and fabricating it are great.

While the titanium ore costs only a few dollars per ton, the metal in sheet and bar form ranges from $15 to $30 per pound. It was only a few years ago that aluminum, because of difficulty of refinement, cost $600 per pound. Then a cheaper process was invented, resulting in today's aluminum price of a few cents a pound. Fortunes are currently being spent in searching for a cheap method of producing titanium from its ore. The question is, how cheap and how soon?

As a result of a vast amount of research, industry can now perform on titanium nearly every operation used on other structural metals and alloys. But most of these operations are more difficult and expensive, and while costs are no longer prohibitive, considerable progress in developing more workable procedures is required.

Researchers and technicians in many fields are enriching their knowledge and developing new and better alloys,

showing us ways of producing better structures for lower costs, and titanium is the metal which currently occupies the spotlight. More money is being spent for research and development of this metal and its alloys than for any other except the uranium-plutonium group. It is the metal which appears to hold the greatest promise for advancement in efficiency of aircraft and other means of transportation, but its general use is not economically feasible until cheaper refining methods and improved metal working procedures are developed.

Rare metals

Germanium has become increasingly useful for diodes, triodes and other parts of radio transmitters, receivers and radar equipment. Use of this metal frees this equipment from vacuum tubes and other fragile parts, making it less susceptible to failure at critical moments through superior shock resistance. Germanium also enables this equipment to operate under higher temperature conditions, with less operating current, and provides smaller and lighter weight electronic equipment.

Zirconium is presently in short supply due to the high cost of extracting it from its ore and the large demand for it by the Atomic Energy Commission for construction of their nuclear reactor plants. The ore, however, is plentiful, and when cheaper methods of refining are invented, many important uses may develop from its inherent characteristics of high purity and excellent corrosion resistance to both acids and alkalies.

Greater use of metal-to-metal adhesives lies ahead for the metal working industries, as can be seen from the already wide use of adhesives in military aircraft. These adhesives have replaced welding, riveting and other fastening methods particularly in wings and control structures and where joining of dissimilar metals must be obtained without fear of electrolytic corrosion.

Use of ceramic as a protective coating will doubtless be greatly expanded in time to come. At present time, the use of a thin coating of ceramic materials on aircraft exhaust manifolds increases the useful life of such parts by as much as 500% above that obtained for uncoated stainless steel.

Through greater use of X-ray, supersonic testing, magnetic particle inspection and fluorescent penetrants, it will be possible to safely reduce the weight of metal parts used in aircraft. Through these and other non-destructive test methods, each weld, forging, casting or other part can be checked for hidden defects.

In general, metallurgists and the metal working departments in the aircraft industries are searching for materials and methods which will result in structures having less weight, greater strength and high fatigue properties, high temperature resistance, better corrosion resistance, and longer safe life.

The accompanying table based on yield strength rather than ultimate tensile strength shows how the strength-to-weight ratio of titanium compares at different temperatures with other principal metals used in aircraft.

Comparison chart—Yield strength to weight ratio Aircraft structural alloys at 70, 300 and 700 deg. F.

Alloy	Weight lb./cu. in.	Yield strength Weight/in cu. in. x 1000 70 deg.	300 deg.	700 deg.	Corrosion* resistance
TITANIUM	0.163				Excellent below 800 deg. F.*
Commercial annealed		430	260	120	
RC-130A		795	610	430	
MST3Al5Cr hot forged 80% reduc.		940	—	—	
MST2.5Fe2.5V sheet					
Annealed		765	—	—	
Cold worked 37%		1040	795	610	
STEEL—Chrome-Moly	0.283				Very poor
4130 normalized		250	—	—	
4340 (HT to 200,000 psi.)		720	—	—	
STAINLESS STEEL	0.286				Good
18-8, full hard		490	—	—	
347, annealed†		105	120†	110	
17-7 P.H. in THD condition		525	—	—	
ALUMINUM	0.101				Requires protective coating
75S-ST6		700	220	50	
MAGNESIUM	0.064				Must have protection
AZ31		450	200	30	

*Corrosion resistance of Titanium up to 800 deg. F. is about equal to that of stainless steel; in sea water, it equals the resistance of platinum.

†The increase in yield strength of annealed 347 stainless at elevated temperature is interpreted as being the result of precipitation hardening of the previously annealed stock.

Pacific Northwest

The atomic energy field continues to expand, placing increased demands on Western fabricators. The President's announced policy of greater emphasis on air power and retaliatory weapons would also seem to indicate a continuing demand. Potential development of power from atomic energy may develop future markets and power supplies, while air power requirements will certainly result in a sustained light metal demand.

The opening of vast areas of the Columbia Basin area to agriculture should result in demand for new equipment, irrigation lines and small maintenance shops. The transportation required should also increase loads on Western plants. Dam construction should result in greater markets and at the same time increase facilities for light metal production.

Present plans for introducing natural gas in the Pacific Northwest should require large amounts of pipe and metals fabrications in addition to pumping plants.

New oil refineries to be located in the northern section signal the beginning of industrial growth in that direction. The past year saw many small plants spring up to provide a ready

Contributors . . .

. . . to this feature are the following Western chapter chairmen of the American Society for Metals:

J. A. Chalk, Los Angeles
B. R. Elder, Columbia Basin
G. S. Fergin, Inland Empire
H. Edward Flanders (secretary), Utah
Robert B. Freeman, Golden Gate
John F. Jones, Pueblo Group of Rocky Mountain chapter
Frank H. Page (vice-chairman), San Diego
Monte E. Parker, Puget Sound
Wm. F. Rotterman, Phoenix
R. L. Stark, Rocky Mountain (Denver)

(Pictures of Messrs. Rotterman and Stark unfortunately were unavailable.)

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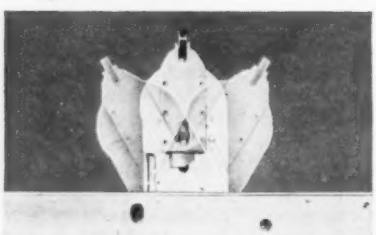
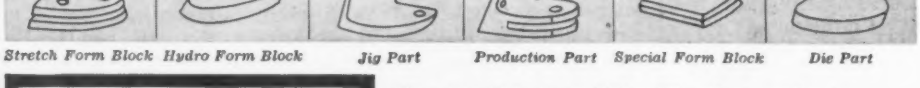
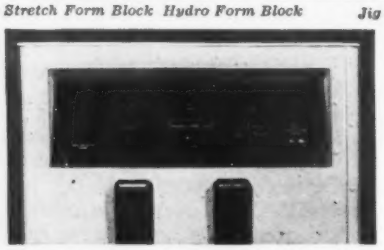


Tilted Belt showing 120° included angle



Stretch Form Block *Hydro Form Block* *Jig Part* *Production Part* *Special Form Block* *Die Part*



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market for metals and metal working. Ground will be broken shortly for the Rheem Manufacturing Co., Tacoma, where tanks, drums and other metal products will be fabricated.

Skagit Steel and Iron Works will be producing 155-mm. steel shell cases at its new ordnance plant at Sedro Woolley by June 1. This $5,500,000 plant is but one of many moving away from congested industrial centers.

Aluminum

Aluminum companies are all expanding their production facilities with the improvement of the power situation and increasing stability of the labor market. Generating capacities which have been as low as 50% due to lack of power are now on the increase. The Alcoa plant at Wenatchee expects to double its capacity immediately and will soon have a rolling mill in operation. Kaiser mill at Trentwood has widened its capacity and can now roll plates and sheets up to a width of 100 in. The Reynolds mill at Longview plans to install a rolling mill to be completed in 1957. The industry's technology continues to advance with a demand for qualified scientists and engineers far outstripping the supply.

Though industries in the Pacific Northwest appear to be in for some belt-tightening during 1954, they will nevertheless lay a base for the old-fashioned prosperity due to their proximity to a growing market.

Arizona

Arizona has shown astonishing industrial growth in the past few years, bringing with it engineers, metallurgists and industrialists. A good percentage of the world's copper requirements are being produced here and millions of dollars worth of manufactured products are being shipped from the Phoenix area every month by such companies as AiResearch, Goodyear Aircraft, Motorola Research, Reynolds Metals and many smaller companies.

The expanding metallurgical industry in the Intermountain States in particular offers worthwhile opportunity for those interested in prospecting, mining, recovery and fabrication of many metals. The dearth of engineering students and graduates in this area is approaching the status of being an industrial handicap. In fact, many societies are offering prizes, scholarships and other inducements to interest students in qualifying for positions in operation, research and management.

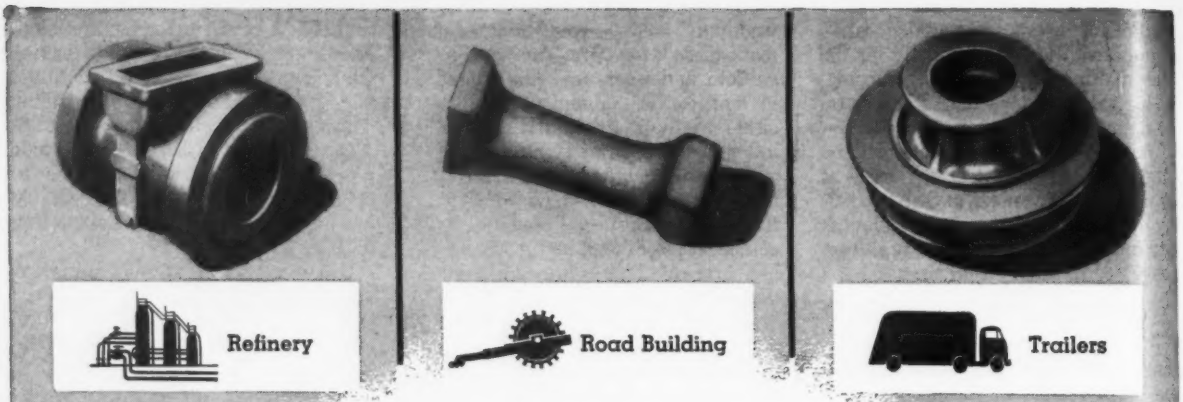
The country's chief mineral resources, with the exception of iron, lead and zinc, lie in the West. Even these three metals are produced in large quantities, while copper, cobalt, uranium, gold, silver, magnesium, manganese, mercury, molybdenum, gallium, and others are being produced in more or less abundant quantities either as by-products of the smelter industries or as primary products.

Fabrication industries are growing in extent and importance along with the West's boost in population, together with all metal and metal-working services which a growing population requires.

Rocky Mountain area

A new seamless tube mill has been completed at the Colorado Fuel and Iron Corp. plant in Pueblo and shipments are being made to oil drilling contractors. Demand for oil continues to spur exploration parties and drilling continues at a healthy rate. The U. S. Department of Interior's oil shale plant at Rifle, Colo., continues to operate, but as yet private industry has not entered the field of extracting oil from shale.

The quest for uranium continues at an accelerated rate with the Four Corners area of Colorado, New Mexico, Arizona and Utah still holding the spotlight as the most important uranium producing area in this country.



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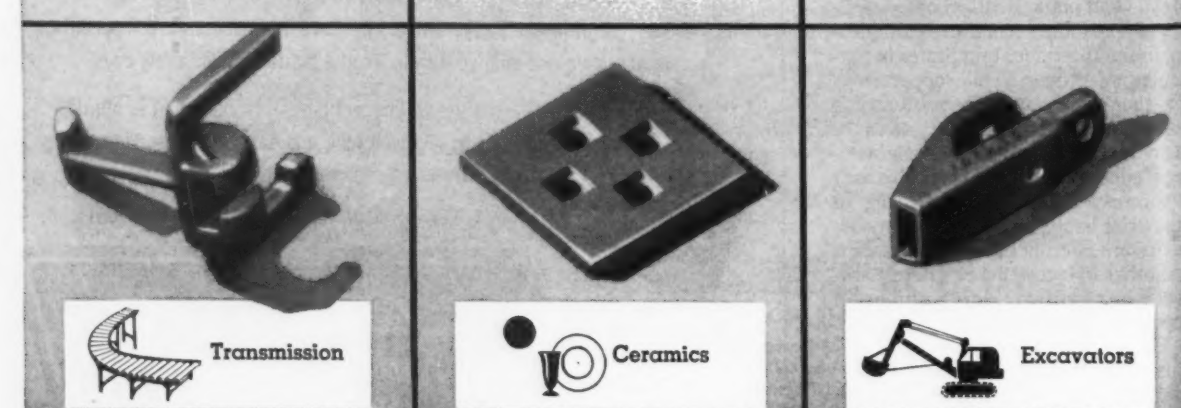

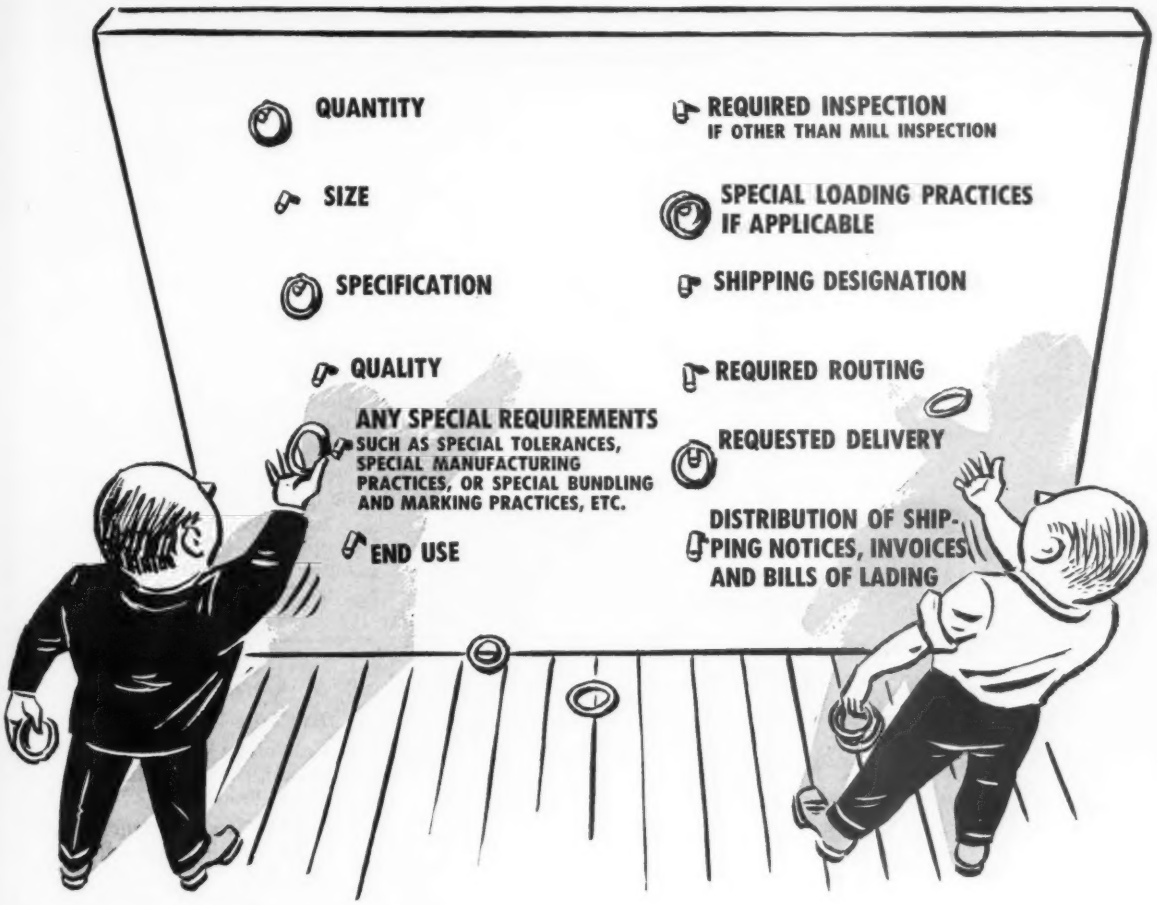

HOW TO BUY STEEL . . .

Here's a survey of Western steel distributors designed to promote efficient and intelligent buying

WHERE is the dividing line between steel warehouse and steel mill? WHEN should a buyer patronize one rather than the other? *Western Industry* here presents the warehouse point of view for the most part, since most of the contributors to this article are warehouses. There are, however, logical arguments for direct buying when the volume is large, and the reader must determine the dividing line for himself.

AS A SERVICE TO purchasing agents and the steel warehouses and mills they patronize, *Western Industry's* editors have conducted a careful survey of suppliers of Western metals in an attempt to crystallize the efficient and intelligent methods of doing business.

The careful analysis and solution of the problems arising from the purchase of steel and other metals from the supplier can reward seller and buyer alike, with such concrete benefits as: fewer returns, more prompt delivery, reduced handling costs, simplified paper work, and the assurance that your supplier will be able to fill your needs when your really in need.

On the other hand, intangible benefits from a realistic buying program can provide valuable information, fewer headaches, more reliable delivery schedules, and the items that best fit your specifications and tolerances at the most reasonable price.

Results of the survey seem to indicate that the most important single key to success is the proper exchange of complete information. Most important here is that the buyer provide the supplier not merely with specifications for the individual pieces desired, but with a complete rundown on all metals used in manufacture, down to the end use of every item.

From a steel production point of view, this is an extremely important factor. There are many metallurgical combinations which can be made to meet a given specification. If the buy-

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er lets his supplier know what type of forming or fabricating he will be performing and what use he is going to put the material to, the supplier can do a far better job for the buyer in furnishing the exact type of material that he actually needs.

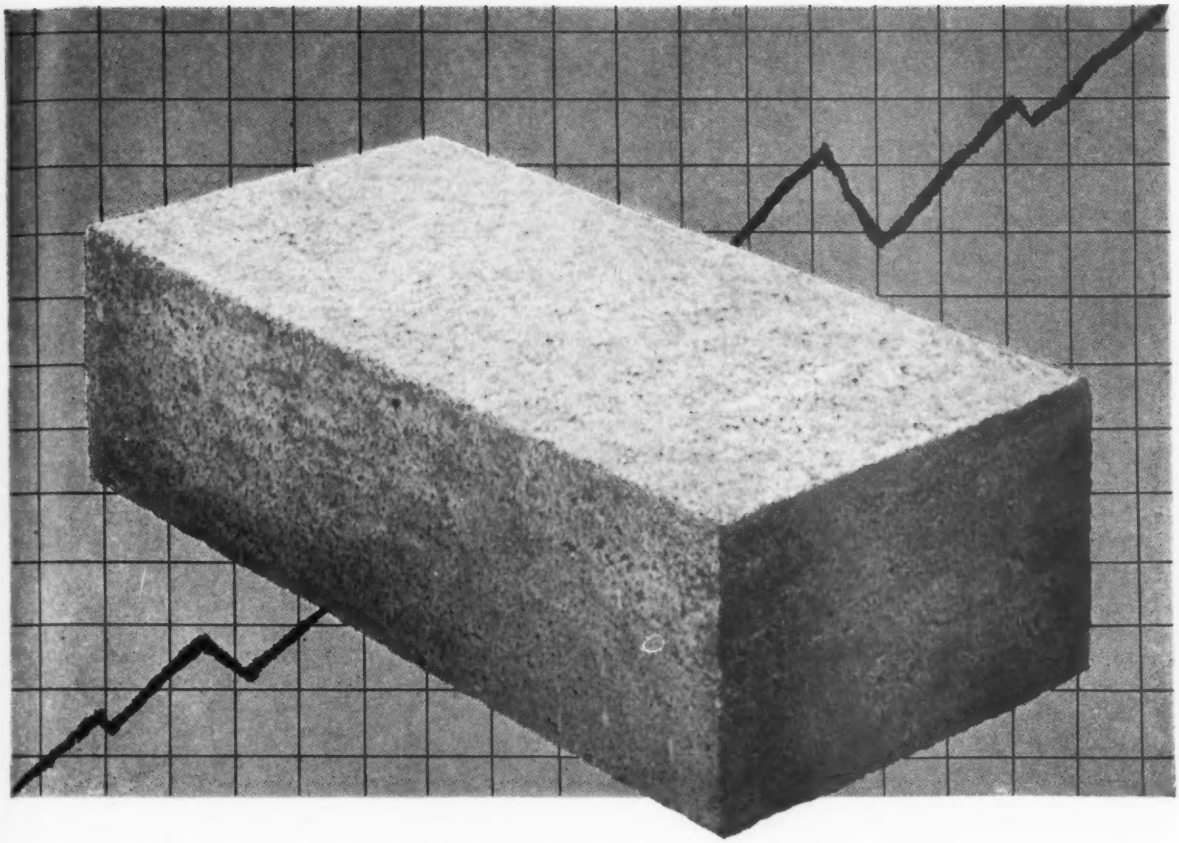
The buyer should emphasize the quality or properties which he knows from experience are absolutely necessary. For example, if the buyer knows that camber in material is costly to his operation, his orders should state that minimum camber is required. If the buyer has any special bundling or extra packaging requirements for the steel producer to adhere to, he should be specific in his request and not leave it to the imagination of the producer supplier. And anything peculiar to the buyer's needs must be brought to the attention of the seller.

Contributors . . .

Barde Steel Co., Seattle
Columbia-Geneva Steel Division, U. S. Steel Corp., San Francisco
Coulter Steel & Forge Co., Emeryville, Calif.
Drake Steel Supply Co., Los Angeles
Foucar, Ray and Simon, San Francisco
Earle M. Jorgensen Co., Los Angeles
Kaiser Steel Corp., Oakland
Pacific Metals Co., Ltd., San Francisco
Reliance Steel Co., Los Angeles
Joseph T. Ryerson & Son, Inc., Emeryville, Calif.
Structural Steel & Forge Co., Salt Lake City
Tay Holbrook Inc., San Francisco
Triangle Steel & Supply Co., Vernon, Calif.
Ziegler Steel Service Corp., Los Angeles

When a supplier takes on a new customer or when a new product is to be made, the steel supplier should be furnished with samples and blueprints putting him in a better position to provide his customer with steel and service.

In specifically providing the steel warehouse with general information, the general nature of your business,



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approximate quantity of goods required and preferred method of doing business should be explained. If this program sounds as though it is divulging too much information, it should be pointed out that through mutual respect and trust both parties can gain from close cooperation, often eliminating numerous sales calls.

From this general information, along with the specific items desired, the seller can often suggest a different type of steel than that originally ordered by the buyer which might save him money not only in his original purchase price but also in his manufacturing operations. In order to provide service of this sort, the buyer must have confidence in his supplier's judgment, knowledge and experience in the field. Results of this survey place repeated emphasis on services the supplier can provide his customers if the customer's real needs are apparent. A good buyer realizes that his best assistant in purchasing is the salesman waiting in his front office. That man generally knows his type of product better than anyone else—better than the design engineer, the workman in the plant, the manager or the buyer. The salesman is a specialist in a narrow field, and chances are he has studied and observed in many plants the working of this special product. He has a definite knowledge that he is dying to pass on to whoever will listen. A smart buyer listens.

Whenever a supplier requests additional information on an order, he is trying to save the buyer later embarrassment when the shop rejects the purchase as not being exactly what was wanted. It is the buyer's job to educate shop personnel to the point where they will describe in detail just what they need. For when the buyer fails in his dealings with his own shop, his answer to the supplier is apt to be, "Well, that's the way they ordered it. If you can't give it to me on that information, I'll find some company that can."

Customer services

Numerous consumer companies do not have trained metallurgists. When this type of company is bringing out a new product or is doing work with which it is not entirely familiar, it will secure an immeasurable amount of help by simply calling in the company with this type of personnel and fully explaining the problem and product. It is only in recent years that smaller plants have had this service available from warehouse steel distributors. This

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service is of considerable importance to users of high quality steels, but also offers value to the user of carbon steel.

A good many dollars can often be saved by recommendation from the supplier's inside salesman. For example, a builder recently calling to order bright finished electric weld tubing for structural application was very happy to learn that square hot rolled butt weld was a better buy since he really didn't need the plating quality. The material also cost him considerably less.

Some steel suppliers complain that in many instances it is only possible to get necessary information after their customer runs into trouble and has failures in the field. By this time he is much more willing to listen. But had he presented his picture in the beginning, a great deal of time and money would have been saved. In this respect, a more complete description of the item ordered would help immeasurably in preventing costly slowdowns in manufacturing after the process is well under way. The importance of complete end use information cannot be overemphasized. Lack of this information often results in serious inconvenience for both the consumer and the producer.

Inventories

Most manufacturing customers can set their production schedule for guaranteed daily delivery, thereby saving dollars of investment in inventory. Low inventory and daily delivery precludes the possibility of losses through price decline, and warehouse buying enables the buyer to keep close tabulation of his costs.

In the process of accumulating large inventories, it is difficult to completely eliminate the factor of obsolescence due to die changes, design changes and production changes. Also, steels are subject to atmospheric corrosion and other losses arising from handling. Imperfect stocks may be the cause of high labor costs in conditioning the material for use or delays in manufacturing or assembly.

Purchasers who buy direct from mills have the material trucked from the station to a receiving plant. After material has reached the receiving platform, it is then handled, sorted and racked. By the time the material is needed for production it is rehandled to bring it to production stations.

Unless there is sufficient volume of material involved to warrant investment in modern handling equipment, it usually will be much cheaper to have a warehouse supplier make the deliveries to meet requirements direct to the production area. In this respect, many buyers fail to realize the many advantages and services that are sacrificed when by-passing steel warehouses for the reduced rates possible when buying from the mills direct.

The space necessary to house the average inventory of quantities usually bought from a steel mill is of considerable proportion and usually quite costly. There are also expenses of maintenance, storage and handling equipment, record keeping and expediting. For buying in anything but the largest quantities, these costs will generally exceed the savings realized by

METALS AND METALWORKING —special section

buying from mills rather than warehouses.

Suppliers' problems

Mill buyers incur substantial extra costs in handling their own material and all too often do not figure these in comparing mill costs to warehouse costs. But while steel warehouses can aid in reducing inventory, storage space, capital investment and handling equipment, these services have been responsible for certain misunderstandings.

Specialty metals such as copper, aluminum, and stainless steel are produced with extreme care by the mills, carefully packed and surfaces protected so that finishes and other forms of possible damage are largely eliminated. Warehouses, upon receipt of this class of material, take extreme measures to protect it for the period that it rests in their hands. This care is also exercised when repackaging for shipment to the customer.

It is then up to the management of firms who purchase this class of material to provide handling space with specific instructions relative to the danger of damaging the material. Proper provision should be made to eliminate chances of denting or scratching by uninformed or careless handlers. The end result would be the elimination of damage claims and misunderstandings, all of which increase the cost of doing business.

With this handling problem in mind, personnel in charge of receiving materials with fine finishes should make inspection immediately upon receipt of such materials and not at some later date when careless handling in the customer's plant may result in damaged material.

Many suppliers complain of difficulty and excessive overhead in issuing credits and initial charges because buyers are not familiar with state and county tax requirements. The buyer should be advised on every order whether the materials are for resale or subject to tax. Very often incorrect information is given in the purchase order and the accounting department then sends through a request for credit or a debit memo. Correct information the first time would greatly reduce these unnecessary adjustments which are costly to both supplier and customer.

It would also be a help to the supplier if items to be ordered are first segregated as to class and then placed in size or numerical rotation, especially when weights and prices are to be requested. A distributor's stock records are always so classified. This arrangement of items on weight or

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price cards can be located and computed faster going down the line rather than jumping from place to place.

Suppliers' responsibilities

Distributors have found that the steel fabrication and warehousing business requires the best possible representation between the company and the buyer. Sales engineers and salesmen must be well qualified as to technical knowledge and information in addition to being qualified representatives of the company.

It is part of the distributor's duty to provide proper training to sales representatives and then back up sales representatives with proper and adequate inventories and prompt and efficient service. In the keen competition found in the warehousing business, management's responsibility to place the proper working tools in the hands of salesmen takes on added importance.

The proper type of sales training and management cooperation assures that buyer's requirements are met in an efficient and intelligent manner consistent with good service at a competitive price. The distributor's results are directly proportional to the proper type of sales representation and the presentation made to the buyer by the sales force both as to service, quality of product and competitive price.

It is a distributor's responsibility to a large extent to familiarize himself with the facilities, the manufacturing process and finished products of the buyer, as it is his responsibility to make the buyer aware of his own facilities and services. He must urge the buyer to take advantage of the many services which are rendered free or at a minimum extra cost such as burning, shearing and cutting of all types.

Probably the most important service is to deliver the right metal to the right place at the right time. This entails assistance in helping a buyer choose the correct type of metal, and building up in him confidence in the supplier's ability to perform miracles when required. In return for the necessary information and cooperation from the buyer, the supplier must be prepared to assist his customer in completely performing whatever services are required to fill his role. Suppliers, generally, realize the difficult position of the buyer as a middleman between the supplier and the shop using those supplies. And they are thankful that most companies, realizing this, have put only high caliber men in their purchasing positions.

Many warehouses will saw, shear and flame-cut to specifications, taking full responsibility for accuracy. If the warehouse should make a mistake, the pieces that were cut to wrong size go into their waste, not the customer's. Steel warehouses are obliged to beat the most favorable delivery schedules of steel mills, passing along the time saving to their customers. Distributors usually have storage facilities for a variety of sizes, types and finishes, and are prepared to deliver a special small order or "fill-out" order to match unexpected shortage in mill quantity.

Tips to P. A.'s

It is important to the distributor that orders be placed as far in advance of delivery date as possible. A purchaser's order is tailor-made for him and this takes time. The producing of steel items is not accomplished by merely pushing a button. And many buyers do not understand the importance of this "lead time." Giving your distributor lead time helps. If the distributor knows when the item goes into production and the buyer doesn't have to wait until the last minute before ordering, service will be improved. As a result, the buyer's receiving department won't be overloaded, nor will it

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BUYING STEEL

. . . Begins on page 59

be apt to be short on items ordered.

When orders are received by steel mills, they are grouped in heat lots by the specification, section, cycle and sequence groupings of the mill by product and size. Based on the week of finish rolling, size, product and specification, the intermediate form of the steel is scheduled on the semi-finishing mills.

These orders should be grouped well in advance of the scheduled week of finish rolling, depending upon the number of conversions, conditioning and intermediate handling required. There are times when, due to a peculiarity of product mix and incompatible quantities and grades, it is necessary to lay down the intermediate form four or five weeks ahead of the scheduled week of finish rolling. Inventories of raw materials must be planned.

The basic factor of control is the order backlog. From the latter the mill develops the number of heats and the various grades required, and supplies of the several elements are anticipated and supplemented accordingly. Open hearth auxiliary operations and equipment must be anticipated likewise.

Capacity ingot commitments require capacity blast furnace operation. This dictates coke plant activity. Raw materials for these two units are anticipated accordingly.

Buyer customs

Some buyers make impossible delivery demands. It is not unknown for a buyer to call up in the middle of the day and request shipment that same day for material which might require several hours of processing. Also, some buyers will suddenly remember all the things they should have ordered during the day at about 4:30 in the afternoon, causing a lot of unnecessary last-minute confusion both for themselves and their supplier.

In instances when the steel producer is asked to make a firm quotation on delivery of a particular requirement, one must take into consideration operating conditions, order backlog and scheduling lead time, as well as product mix of the producing mill. For this reason, the buyer should indicate to the seller the date he expects his requirement to become firm—in other words, when he expects the job to be awarded. Only in this manner can the seller gauge how long he will be expected to keep his quotation open. Too often material is demanded immediately, but not used for several days.

In submitting summaries, buyers are often prone to generalize. In such cases, valuable time and effort is expended in an attempt by the seller to pinpoint specifically what the buyer actually wants to purchase. For example, buyers will sometimes submit an inquiry relating to price and delivery availability for a given quantity of a product. In such instances, it is then necessary for the seller to recontact the buyer regarding the specific details of size, specifications and special processing or finishing requirements.

This is necessary in order to determine whether the product he is seeking is within the seller's production capabilities or whether production space is available. All this could be avoided if the inquiry were detailed and specific.

Placing of orders

The placing of orders on the part of the customer and the entry of these orders on the part of the purchaser could be simplified appreciably if the customer would list his requirements in a consistent manner on a standard order form. Handling the entry of orders in this fashion would preclude the possibility of error and would expedite the placing and entry of orders for all concerned.

Buyers are also prone to write purchase orders as briefly as possible. As

in the case of inquiries, the buyer should be as explicit as possible. The accompanying check list should, in many cases, be a valuable guide, provided buyers will give the specific information needed under each heading.

Once in a while the buyer will make no reference to how he wishes his material to be shipped (truck or rail) or what he is going to use his material for. Again, this results in loss of valuable time and effort on the part of the supplier in recontacting the buyer to obtain this information.

Buyers should be very familiar with steel price extra books. By being thoroughly familiar with quantity extras, bundling and packaging extras, specification extras, etc., they can often save money for their company.

Do's and don'ts

Certain buyers are not well enough acquainted with their own products to intelligently order material. Some purchasing agents make a practice of having a secretary or office clerk order material, and it is a rare case when such a person has the answer to routine questions. Usually she has to leave the phone in order to find out, or else call back.

In some firms there is a lack of coordination between purchasing and receiving departments. For example, a buyer may be following up a supposed late delivery when the material was actually received some time before. Incredible as it may sound, some buyers forget from whom they have ordered material. They will make a follow-up call and insist the order has been placed, and after a great deal of investigation suddenly discover they placed it with another supplier.

For some reason, many buyers seem reluctant to answer such routine questions as whether a purchase is subject to sales tax, what method of delivery is desired, what their purchase order number is, etc. Reticence to provide this "top secret" information necessitates the telephone salesman doing considerable detective work in order to get it.

Practically all of the above complaints refer to telephone buying, this being the method through which about 90% of steel warehousing business is handled. With this in mind, mailed orders are generally confirmations of previous telephone orders and strict care should be taken that they are so indicated. Otherwise, duplicate shipments will result which are costly and inconvenient.

If the buyer has a mental picture of the item in question, it helps him or the order clerk to understand a particular problem, such as non-stand-

BUYING STEEL

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ard item. For example, an odd-size piece of tubing, where, by description, the parties interested can visualize what can be done and offer some close standard size.

It will be considerable help to the supplier if customers will always give the required tolerances on any orders requiring shearing, slitting, sawing or burning. One of the pet complaints of steel distributors seems to be the fact that many buyers tend to mumble their orders over the phone and very often expect the distributor to recognize their voice and firm.

As a matter of courtesy in business-like dealings, buyers should immediately state their name and company affiliation and speak as clearly and concisely over the telephone as possible. Often buyers are not properly prepared when placing an order on the telephone. They do not have complete information regarding sizes, specifications, etc., and much time is wasted in not having items arranged systematically by size, type, etc. It is particularly poor practice for a buyer to try to order directly from a blueprint. This generally causes considerable hemming and hawing and often errors. Blueprints should be translated into an orderly list before placing orders.

It would be appreciated by the steel distributors if their customers, immediately upon encountering trouble of any type in the performance of the material, would cease that particular operation, contact their supply source, and await the arrival of a product specialist. By this course of action, many expensive claims for partially processed material can be eliminated.

Dickering

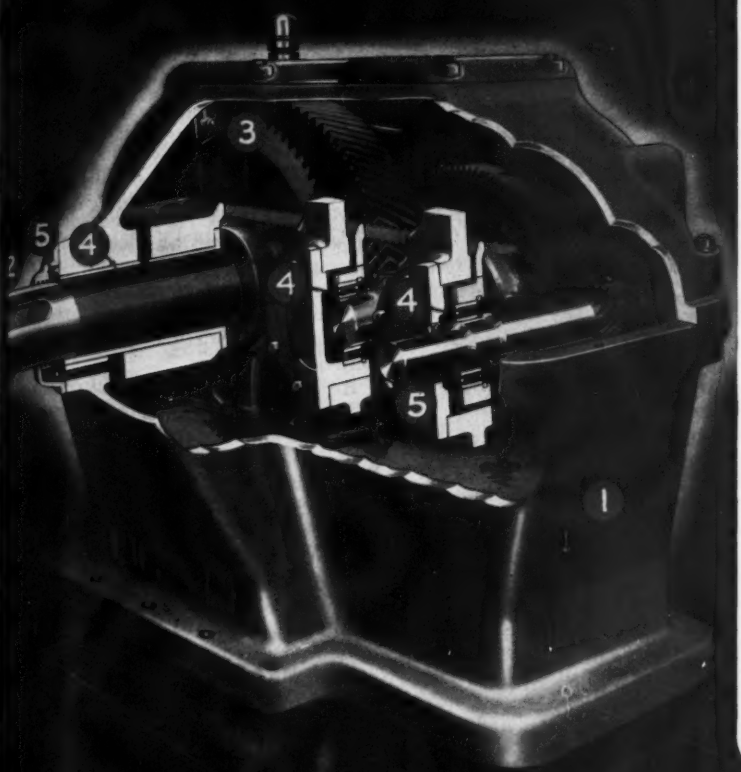
There are, unfortunately, certain groups of buyers and purchasing agents who, without regard for over-all market conditions, do their best to chisel and obtain lower prices on products carrying only a normal markup. There have been innumerable occasions, particularly in the past few months, of buyers informing their suppliers that they can obtain steel or supplies at a lower price than is actually the case. Past business practice would indicate that it is often unwise to drive too hard a bargain with a supplier. Very often it is the buyer who eventually loses by this practice.

Customers who gain the most for their dollars are those who are fair, and indulge in a little "give and take" in attempting to be perfectly honest with their suppliers. Buyers should be impressed with the fact that a stable price market is important to all concerned. Buyers have a considerable stake in this market.

Considering the vast size of steel and other metals distribution within the eleven Western States and considering the great diversity of its manufacturing and building customers, *Western Industry's* survey turned up surprisingly few cases of misunderstanding in giving and taking steel orders. While an occasional customer ordering 2 in. x 14 gauge tubing will fail to specify "round" or "square", those who deal with Western warehouses have become increasingly aware of the necessity for smooth buyer-supplier relations. It has been brought home to manufacturing management that a skipped line in an order or transposed quantities of items can seriously affect operating costs.

Although the human element in buying and selling steel has not been replaced, a framework has been developed to make this operation as foolproof as possible. By taking the utmost care possible and by having the supplier read back the entire order before accepting it, purchasing and handling costs can be reduced and innumerable headaches eliminated.

The Lufkin Gear Box Lubrication System . . .



The heart of an oil field pumping unit is the gear reducer. Pumping service is generally considered to be one of the toughest applications for gears. Lufkin's total output of gear reducers in this class is now over thirty thousand units. Here are the reasons Lufkin is still first in oil field reducers:

1. The Lufkin reducer housings are of rugged construction.
2. All shafts are forged from alloy steel which is heat treated and precision ground.
3. Gears which are precision cut on our Sykes Herringbone machines are used exclusively in Lufkin Units. These gears operate in an oil bath with gear wipers to flood the bearings.
4. Lufkin uses oversize bronzoid bearings on crankshafts and the crankshaft is held rigid by hub plates on the bearing. The pinions float on Hyatt Hy-Load Roller Bearings.
5. The pinion shaft bearings are equipped with patented oil seals, to prevent oil leaks; while the main crankshaft is equipped with collar oil slingers and annular grooved drain covers.

LUFKIN FOUNDRY & MACHINE COMPANY

LUFKIN, TEXAS

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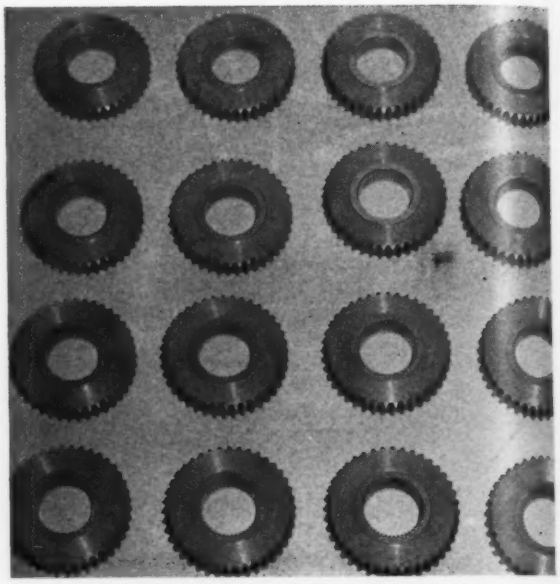
PACIFIC COAST DIVISION—5959 So. Alameda, Los Angeles 1, Calif.

New nickel plating process offers—

ACCURACY
CONSISTENCY
and
PROTECTION



TEETH of these gears were masked with heat-resistant strip coatings so that their center sections alone could be nickel plated for increased wear resistance.

WEAR and corrosion resistant nickel coatings are now being applied to a variety of steel and cuprous products—many of which cannot be electroplated—by means of a new finishing process developed by Chemplate Co., Los Angeles.

This process is a chemical reduction technique, similar to the "silvering" methods that have been used to deposit metal on glass in the production of mirrors. It is said to be especially suitable for the plating of:

1. Overmachined or overtapped components of an expensive nature which might otherwise have to be scrapped.

2. Complex parts such as valves, regulators and bearings which could not normally be plated due to the inadequate "throwing power" of electroplating facilities.

3. Instrument parts, fine gears and threads which must be plated with more than average dimensional accuracy.

4. Tools and dies which could not be satisfactorily protected or salvaged if they were chromium plated in the usual manner.

5. Pipes, cylinders and tubes whose inner and outer surfaces could not be simultaneously finished with standard electroplating equipment.

Parts to be plated by means of the new process are first carefully cleaned, much the same as if they were to be electroplated. This normally involves immersion in an emulsion cleaner, acid solutions, and an alkali bath for removing rust, grease, oxides and other substances which might prevent the adhesion of nickel particles to the parts' deposition surfaces.

Salt bath

Cleaned parts are immediately immersed in a hot nickel salt solution. This catalyzes the solution and causes nickel to be reduced and deposited over all component surfaces that have been wetted.

Even the surfaces of holes of less than ⅛-in. diameter and extending through several inches of solid metal, have been uniformly nickel plated by means of this process.

Plating baths are heated and mechanically agitated in order to maintain a maximum plating rate—about 0.0005 in. per hour.

Coatings applied by means of the process are only about 93% pure nickel (remaining components being phosphides). However, they are as good as and sometimes better than pure nickel coatings.

Although no deposition current is required the coatings involve a slightly higher production cost than electroplated coatings because:

1. Plating solutions must be heated and mechanically agitated.

2. The pH and temperature of plating solutions must be controlled with relative precision.

3. Processing solutions must be repeatedly purified with sand filters, resin-type deionizers, etc.

Therefore, Chemplate finishes are applied almost exclusively to products that could not be satisfactorily plated with electrodeposition facilities.

Perhaps the most unusual feature of the new process is the fact that it permits the uniform buildup of nickel plate (within tolerances of plus-minus 0.00005 in.) over all surfaces that come in contact with the plating solution—regardless of how irregular the configurations of a product may be.

There are no theoretical limitations on the thickness or thinness of the coating, but there are some practical limitations in view of the fact that the cost of a given coating is proportional

METALS AND METALWORKING —special section

to its thickness. For example, while company personnel have been able to deposit layers of nickel with thicknesses up to 0.013 in. to permit the reclamation of expensive metal parts which had been overmachined, the best coating thicknesses for most practical purposes are approximately as follows:

Indoor protection	0.0005 in.
Mild outdoor protection	0.001 in.
Severe outdoor protection	0.0015 - 0.002 in.
Abrasion resistance	0.001 - 0.003 in.

Standard qualitative tests have consistently shown that the adhesion of Chemplate nickel coatings to brass and steel surfaces has a value exceeding 50,000 psi. This is attributable to the fact that the new plating process establishes both chemical and mechanical bonds which are much stronger than those normally produced with electrodeposition equipment.

Company officials say their coatings have been used with particular success on gears, bearing surfaces and other components requiring extreme wear resistance because of "an inherent lubricity which is quite unique." This is probably because nickel deposits are of exceptionally low porosity since the wear resistance of a metal is usually proportional to its density.

Corrosion resistance tests, made with SAE 1010 steel test specimens which had nickel coatings of 0.001-in. thicknesses, have thus far yielded the following typical results:

1. Salt spray—300 hours minimum, without generalized rusting.

2. Outdoor exposure—six months minimum, without any rusting.

3. Hot water immersion—six weeks in 180 deg. F. air-agitated water with no visible rusting.

In the as-plated condition, the coatings are much harder and more brittle than conventional nickel finishes. The brittleness can be eliminated, if necessary, simply by heating plated components to 750 deg. F. for 30 minutes to relieve internal stresses.

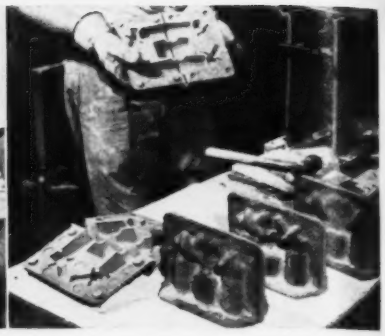
Where it is desirable to increase both the ductility and mechanical strength of a coating, plated components may be heat-treated for short periods of time at temperatures up to 1100 deg. F. Higher temperatures tend to reduce the surface hardness as well as the brittleness of the nickel plating.

Luster of a Chemplate coating, like that of an electrodeposited nickel coating, depends on whether brightening agents have been added to the plating solution. Since this usually has nothing to do with the utilitarian qualities of the finish, dull or semi-bright finishes are usually preferred in order to minimize the cost of plating.

Due to the need for relatively hot plating solutions, parts processed cannot be masked in a conventional manner. However, heat-resistant plastic strip coatings have been satisfactorily used as masking media without increasing the cost of finishing operations greatly.

Although it is now being used for the sole production purpose of finishing ferrous and cuprous materials, the process has many undeveloped potentialities and may eventually be adapted to the work of depositing materials other than nickel on both metallic and non-metallic surfaces.

RESIN-TYPE deionization equipment which is now being used to purify new-type nickel plating solutions.



1. Naked pattern is sprayed with a release agent to simplify later the stripping of the shell mold from the pattern. 2. After heated pattern has been placed in a molding machine and the sand and plastic mixture has formed a thin shell on the pattern, the pattern is removed from molding machine. 3. Shells are next removed from pattern ready to be mated.

The West needs SHELL MOLDING PATTERNS

Opportunities to serve Western foundries are going begging

By
WALTER H. DUNN
Superintendent
Stainless Alloy Foundry
Solar Aircraft Company
San Diego

A NEW opportunity for pattern and tool shops on the West Coast—the making of metal patterns for foundries engaged in shell mold casting—is going begging today.

In the last few years, the shell mold process has grown from almost nothing to a major foundry technique. To utilize this new process satisfactorily, top-quality patterns are a necessity. Yet, with only a few exceptions, West Coast patternmakers are not gearing their operations to this new demand.

That, at least, is the experience of Solar Aircraft Company's stainless alloy foundry. Located in Solar's San Diego plant, the foundry has been working with shell molding of stainless and high alloy castings for about four years, and introduced the process to the West Coast.

Briefly, here's what shell molding is:

A shell molded casting is made by pouring molten metal into a mold made of sand bonded with a thermal-setting plastic. The process starts with the making of a metal pattern, usually corresponding to half of the casting desired—with a similar pattern, of course, made with the contours of the other half. The pattern is then heated to about 500 deg. F. and placed in a special molding machine which contains a powdered mixture of sand and plastic. The pattern heat causes a thin shell of plastic and sand to solidify to about one-quarter inch thickness. The shell is then stripped from the pattern, mated with the shell of the other half of the pattern, and the casting is poured.

Although it may sound like a simple development, shell molding has been hailed as a revolution in foundry practice. When properly employed, the technique can result in higher quality castings at lower cost—which is a major aim of any industrial development.

Shell mold castings offer these important advantages over alternative methods: Better surface finish than sand castings. A minimum of burnt-in-sand. Better dimensional control. Reduction or elimination of machining. Simplified foundry operations, possible mechanization, and increased productivity. Reduction in sand-to-casting weight. Increased metal yields. Generally improved quality.

How does all this affect the patternmaker?

Patterns are much more important in shell molding than in the more conventional baked sand process. They cost much more and they must be built to much higher standards.

Shell molding is a semi-precision operation—much more precise than sand casting. While roughness and undercuts are not too important in a pattern for sand, the shell mold pattern must have a polished finish with no backdraft.

Tolerances with shell are highly important. On many alloy castings made by Solar, the foundry must hold the casting dimensions to ± .005 in. This invokes on the patternmaker much tighter tolerances—in this example, the patterns must be held to ± .002 in.

Again, pattern costs are much higher, which makes errors due to faulty design or poor patternmaking much more

METALS & METALWORKING —special section

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costly. The patterns used in the Solar shell molding operation range from $300 to $2,000 each, largely depending on intricacy rather than size or material.

The shell mold patterns used by Solar are mainly made of three materials—aluminum, bronze or high nickel cast iron. About 75 per cent of the Solar patterns are made of aluminum, about 5 per cent of bronze, and the balance of iron. The choice is determined by three factors—the length of run, complexity of the casting, and size.

Aluminum patterns have the shortest life, with bronze next and cast iron by far the longest. On a complex pattern, aluminum is the cheapest to machine, iron most expensive. Size is an important limitation in the use of iron patterns—if they get too big, they are impractical from a handling standpoint.

At present Solar is buying from four to six shell mold patterns a month—and the company cannot estimate how many patterns are needed by other users of the shell mold process on the Coast. However, as the process develops the volume of business will inevitably increase. Solar is buying all its patterns in Southern California at this time, although the search for qualified pattern shops in the area is difficult.

It is important to note that shell mold patterns, in addition to the differences in the metals used, also fall into two other broad categories: all-machined patterns, and those cast to shape and then cleaned up. Here again the decision between types is an economic one. Of the shell mold patterns used by Solar, about three-quarters are cast and the balance machined.

The difficulty lies in . . .

There is no great problem in obtaining satisfactory machined patterns, since many tool shops in the area can produce them. The limiting factor is this: if a pattern is easy to machine, and thus comparatively inexpensive, the same would be true of the part itself—and therefore such a part would be fabricated by machining rather than casting.

It is with the patterns that are cast to shape that Solar has difficulty in finding suitable sources. In fact, the company has only one such supplier in Southern California—and that shop was given special instruction by Solar in the problems of shell mold patternmaking.

The steps followed in making a cast pattern include: first, the making of a wooden pattern of the finished part; next, production of a zinc casting from the wood pattern, and the machining of the zinc casting to size; third, making a plaster or shell mold of the zinc casting; and finally, the casting of the final pattern in the plaster or shell mold. After these steps, the final cleanup of the pattern takes place.

For shops interested in entering the shell mold pattern field, we wish to offer a group of suggestions.

1. Personnel must learn to work to much closer tolerances than those they are accustomed to. The average patternmaker is baffled by a request to hold tolerances to plus or minus .002 inch.

2. To handle such close tolerances, the shop must procure instruments and equipment for accurate measurements. This equipment can be expensive and persons who use it must know their business. Most conventional patternmakers with their present equipment cannot even measure ± .002 inch—and hence, obviously, cannot machine to that accuracy.

3. Quality of workmanship must be much higher than the average sand mold pattern—slap-dash methods will not work. The finish required on the patterns must be polished without scratches or defects.

4. The patternmaker must forget what he knows about riser and gate designs and learn new methods applicable to shell molding. The risers and gate systems are entirely

More on page 82

WHY IT PAYS TO BUY STEEL FROM WAREHOUSE

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UNITED STATES STEEL

FLAME SPRAYING...

Research develops new processes for high temperature coating of metals

THROUGH CONTINUING RESEARCH, the development laboratory of Ryan Aeronautical Co., San Diego, is gaining increased knowledge about high temperature ceramic coatings. During the past four years, these thin refractory coatings—one thousandth of an inch thick—have been successfully applied to thousands of Ryan components for jet, piston and rocket engines.

Recently, the laboratory has accomplished several techniques such as flame-spraying refractory materials, ceramic coating large, thin-walled jet structures and welding through ceramic coatings.

Still in the research phase, flame-spraying is a spectacular operation in which powdered refractories can be momentarily liquefied and sprayed on metal surfaces. For this work, Ryan uses a spray gun which is designed for metal spray-welding purposes. Laboratory technicians have converted it to the application of cermets—or combination metal-ceramic powders.

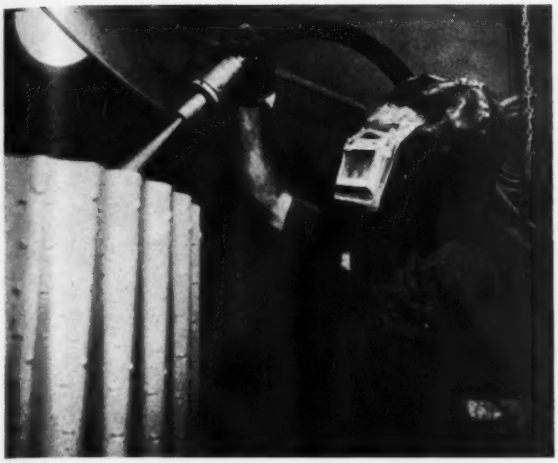
Ryan has successfully flame-sprayed the promising cermet, nickel-magnesia, as a coating on stainless steel, inconel and other high temperature alloys. This cermet is made from nickel and magnesium oxide which have been combined, sintered and ground to powder. It has demonstrated its capacity as a coating to withstand temperatures up to 3,500 deg. F. for limited periods.

With a very high fusing temperature, nickel-magnesia cannot be applied to metal structures by ordinary furnace fusing methods. Ordinary furnaces will not provide temperatures above 2,100 deg. F. Especially insulated furnaces are expensive and difficult to design and operate for handling sizable parts. Another drawback is that jet engine alloys cannot stand the necessary fusing temperatures without losing strength and suffering other undesirable physical changes.

Flame-spraying circumvents these obstacles. The technique heats the cermet to the fusing point without bringing the base metal, to which it is applied, close to dangerously high temperatures. It avoids the use of expensive furnace equipment.

At Ryan, the nickel-magnesia powder is placed in a metal container attached to the flame-spraying gun. Nitrogen gas forces the powder through a tube and into the hot torch nozzle. Oxygen and acetylene are also piped to this nozzle where they burn with a temperature of 5,500 deg. F.

As the cermet flows through the hot flames it liquefies and is sprayed on the metal surface, like a fiery paint. Leaving the flame area and impinging upon the cooler



COATING stainless steel parts with powdered cermets which have been liquefied and blown through 5,500 deg. F. flames.

metal, the cermet cools, solidifies and adheres in a refractory coating which can be applied to prescribed thickness. The base metal is not heated to temperatures which could cause warping or buckling.

The flame-spraying gun is light and dependable. Four valves control the flows of oxygen, acetylene, cermet powder and nitrogen. Care must be taken to obtain uniformity in coating thickness. Ryan has applied the coating in various thicknesses ranging from less than .001 to .020 in.

TORCH BEATS CHIPPING...

Change in methods speeds up big welding job

A CHANGE in requirements on three trash racks being made for McNary Dam left Seidelhuber Iron and Bronze Works of Seattle with a 12-day job removing and rewelding over 1,500 double fillet welds four and one-half inches long.

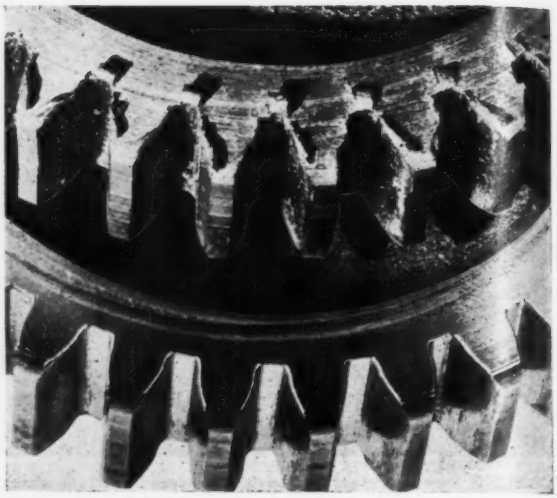
The job required removing 167 triple welded mild steel cross members on each of these racks. Two racks were completely stripped in two days, using an Arcair cutting and gouging torch to remove the welds, a job that would have taken 12 eight-hour days to complete with a chipping hammer.

A chipper was used to strip the first rack. Two men working full 8-hour shifts took three days to complete the job, plus the help of an extra man sharpening chisels.

The remaining two racks were stripped with the Arcair torch. One man using the torch completely removed the 167 cross bars on each rack in one day, 16 manhours for the two racks. The only additional costs were the Arcair carbon electrodes, which amounted to $4 per rack, and operation of an air compressor and welding machine.

In addition to the time saved in actual removal of the welds, the job done by the Arcair torch required far less grinding to prepare the surface for rewelding.

The torch was specially purchased for this job on recommendation of one of the welders, who had previously worked with the same torch. Labor saved on the two racks paid for two-thirds of the cost of the Arcair torch; had the torch been used for all three racks it would have completely paid for itself on this one job alone.



GEAR before brushing on workpiece holder (above) and after rapid brushing (below).

BRUSHING

for removing burrs and finishing gears

IT IS ESTIMATED that the primary cause of as high as 80% of the troubles of well designed machine parts is stress concentration and resulting progressive fractures.

The most common occasions for fractures are at sharp edges, tool marks and scratches which cause abrupt changes of cross-sections, where the V-notch effect of such flaws presents the opportunity for the stress to exceed the strength of the material. Naturally burrs and sharp edges crumble away rapidly.

Stress concentrations which occur at tool marks, scratches, sharp edges or burrs may start microscopic cracks. With continued repetition of the stress, the whole member may rupture.

Some investigators have presented data to show that a sharp corner or edge may reduce the endurance limits of a part as much as 50%. A distinct V notch, such as would be made with a hard tool, may reduce the endurance limit as much as 60%. This reduction, which is traceable to the concentration of stresses, can be minimized by brushing.

While removing the burrs, brushes can produce simultaneously the smooth surfaces and well rounded edges which blend the joining surfaces as they should be. The correct flexible nature of properly specified brushes enables them to blend tool and grinding marks as well as intersecting surfaces and helps reduce the number of potential starting points for small cracks. These small cracks may not cause complete fracture, but will result in small burrs and metal breaking off that will foul the lubrication system and cause unnecessary wear.

Brushes have also proven to be a practical and economical method for finishing surfaces so as to distribute stresses. In reducing stress concentrations, the blending of sharp

METALS & METALWORKING —special section

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Whether you are in Richmond, Emeryville, or the San Joaquin Valley ZSS trucks can get there fast on high speed freeways. The San Francisco-Oakland and San Mateo bridges offer quick access to the City and Peninsula industrial areas. The new bay bridge will come practically to our door providing even greater convenience for Bay Area steel users.

ZSS warehouse locations in Los Angeles and Oakland were selected because they were near to the new high speed freeways to allow for faster delivery to your plant and to permit your trucks to make pick-ups without having to fight cross-town traffic. Our plants are located away from congested districts and yet are accessible to all major industrial areas.

For all your needs in hot rolled, pickled and oiled, cold rolled and galvanized sheet, strip, bars and shapes, call ZSS for faster delivery and easier pick-up.

BARS · STRIP · SHEET · SHAPES

ZIEGLER STEEL SERVICE CORP.

LOS ANGELES 22 • 7022 BANDINI BLVD. { RAymond 3-3131 / PArkview 8-1266

OAKLAND 21 • 727 — 66TH AVENUE { LOckhaven 2-2133 / *From San Francisco* Enterprise 11037

markings is the first consideration and smoothness may or may not be required. Brushing works toward the reduction of friction, avoidance of scratching and seizing, and minimizing contamination of lubricants by metal particles.

The fineness of the finish is determined by the type of brush and auxiliary compound used. The action of brushing is that of blending surface irregularities, rather than actual removal of metal to form a part to dimension, as do cutting and grinding tools. Surface analyzer readings may show surface roughness of 24 to 35 micro-inches before brushing; the readings may be reduced to from 4 to 7 micro-inches after brushing.

In the past, tooling up for the production of many machine parts completely neglected the consideration of removing burrs, sharp edges, tool marks, and metallic detritus, and left the selection of methods for doing this work, very often, to an operator. Consequently, slow, laborious methods became accepted standards and much time and labor was lost unintentionally. With demand for both increased quantity and quality production, many plants have found that the burr-removing departments would bottleneck many others as production increased.

Brushes properly applied remove burrs and need not produce a secondary burr or create two sharp edges in place of the one removed.

An example of modern brushing methods taking time-consuming hand work out of polishing, burring and finishing small parts is the new Osborn brushing machine, adaptable to many sizes of brushes and usable on a wide range of larger gear sizes. The operation of this machine is so easily learned than an unskilled operator can attain high quality, rapid production quickly. The entire job of the operator is placing the gear on the turntable. Once this is complete, his job is complete until the gear is brushed and ready to be removed.

As the brushed gear is removed, an unfinished gear is placed on the table, and so on. The table rotates the gear. A pre-set timer retracts the brushes and the motion is stopped until again actuated by the operator. The amount, direction and quality of brushing each gear receives depends on the type of gear, metal, surface desired and type and method of application of the brushes.

SHELL MOLDING PATTERNS

. . . Begins on page 74

different in shell than those used for the wooden sand casting patterns.

5. Pattern shops must learn how to work in metal—and most such shops have made wooden patterns exclusively.

6. Many tool shops, on the other hand, know accurate metal-working techniques, but they must learn foundry practices to turn out good patterns at acceptable prices.

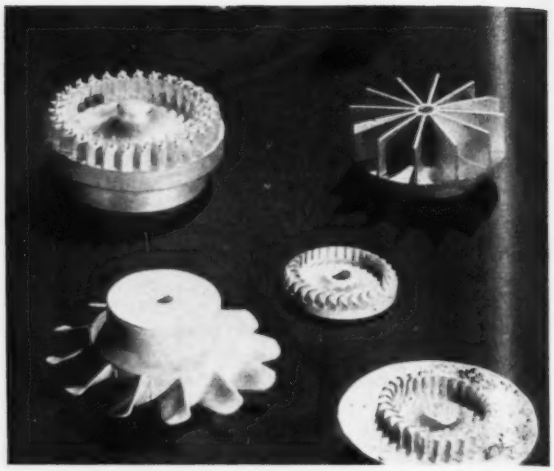
It was pointed out earlier that shell mold patterns are very expensive. Changes after a pattern is made are equally costly. Once a foundry receives a shell mold pattern, a relatively long tool proofing time is required. It is seldom possible to turn out a casting from a new pattern in less than two or three days. Solar normally estimates a two-week period from receipt of the pattern to approval by the customer of the first casting. Also, patterns are easily damaged—if a soft aluminum pattern is dropped on the floor, it can cost several thousand dollars. Actually, the patterns are precision tools for production of precision parts, and they compare in price with the expensive patterns used in precision investment casting.

As shell molding grows, the opportunity for pattern-makers will grow. Right now, the lack of trained pattern-makers is hampering the growth of shell molding.

ANNUAL STEEL CAPACITY

(ingots and steel for castings)
as of January 1, 1953
(From American Iron and Steel Institute)

Plant location and operating company	No. of furnaces	Annual capacity (In thousands of net tons)
CALIFORNIA		
Emeryville		
Judson Steel Corp.		
Open hearth	3	76.5
Fontana		
Kaiser Steel Corp.		
Open hearth	9	1,536
Los Angeles		
Bethlehem Pacific Coast Steel Corp.		
Electric and crucible	3	402
Southwest Steel Rolling Mills		
Electric and crucible	1	45
Niles		
Pacific States Steel Corp.		
Open hearth	3	198
Electric and crucible	4	100
Pittsburg		
Columbia-Geneva Steel Div.		
Open hearth	7	397
General Services Admin.		
Open hearth	2	60
Electric and crucible	1	12.3
South San Francisco		
Bethlehem Pacific Coast Steel Corp.		
Open hearth	5	252
Torrance		
Columbia-Geneva Steel Div.		
Open hearth	4	202
Electric and crucible	1	12
National Supply Co.		
Electric and crucible	3	50.2
Total:		
Open hearth	33	2,721.5
Electric and crucible	13	621.5
COLORADO		
Pueblo		
Colorado Fuel and Iron Corp.		
Open hearth	16	1,485
OREGON		
Portland		
Oregon Steel Mills		
Electric and crucible	3	110
UTAH		
Geneva		
Columbia-Geneva Steel Div.		
Open hearth	10	1,675
WASHINGTON		
Seattle		
Bethlehem Pacific Coast Steel Corp.		
Open hearth	5	246
Isaacson Iron Works		
Electric and crucible	2	102
Northwest Steel Rolling Mills, Inc.		
Electric and crucible	2	42
Seidelhuber Steel Rolling Mill Corp.		
Electric and crucible	1	60
Total:		
Open hearth	5	246
Electric and crucible	5	204



Some of the unique forms extruded by AiResearch.

PRODUCTION TIME CUT from 4 hours to 40 seconds

AiResearch extrusion press boosts fan output 400:1

ALUMINUM WHEELS and fans are being extruded hot to finished sizes and difficult contours on a specially designed 1,100-ton Lake Erie press at the Phoenix division of the Garrett Corp., cutting production time from 4 hr. to 40 sec. per item.

The wheels and fans with diameters ranging from 2 to 4.5 in., and weights of 2 oz. to 1½ lb., are produced with tolerances as low as .001 at the rate of 100 per hour. These parts are used in the air cooling, refrigeration and ram air turbines produced by AiResearch for commercial and military aircraft.

Fans with ten deep blades, bucket wheels with 30 precision buckets and radial air foil sections all to finished sizes are some of the processes currently being handled by the press.

Using a ram force of 350 tons and a die clamping pressure of 750 tons concentrated in a 2 to 3 sq. in. area makes the press operation unique. Speed of the press action is unusual in that the ram force is exerted at 390 in. per min.

Tough alloys such as aluminum alloy 14S with a tensile strength of 60,000 psi. make strong fans but complicate the problem of extrusion. Previously produced by hand duplicating, which took four hours per fan, the 100-per-hour rate represents a considerable saving. In addition to the economical advantage the quality of the products is far superior. Items produced by the previously used milling process came out with a grain structure of the aluminum that remained in an axial direction.

By extruding, the grain flow is changed to a radial flow

METALS & METALWORKING —special section

right out to the ends of the blades, making a stronger, better made wheel. Strength is an important factor for the wheels, which spin at speeds of 50 to 100,000 revolutions per minute.

The press, which weighs 100 tons, was built by Lake Erie to AiResearch specifications. It is electrically driven, self contained and hydraulically operated. Controlled electro-hydraulically, it is water cooled and has a nitrogen bottle type accumulator. The dies are made from high alloy steel.

Aluminum slugs are preheated in an oven, placed in the press die with long-handled tongs and extruded in a matter of seconds. Once cooled, the fans are either sent to heat treat or to be machined directly, depending upon the alloy. The only machining required consists of work on the bore hub or outer diameter. No contour machining is necessary.

PLATE STRETCHER... Spokane gets world's largest

THE WORLD'S largest aluminum plate stretcher is now in operation in the Trentwood rolling mill at Spokane of Kaiser Aluminum & Chemical Corp.

Ninety feet long, 19 feet wide and standing 11 feet above the floor, the Trentwood stretcher exerts a pull of 5,000,000 lb.

Built by Watson-Stillman Company, it required 268 cu. yd. of concrete for footings and the stretcher itself weighs more than 300,000 lb. By comparison, only 20 yards of concrete are needed for the basement of an average house.

Its purpose is to flatten aluminum plate to relieve residual stresses resulting from rolling and heat treatment. The stretching provides material which may be machined with an absolute minimum of distortion.

Stretched plates will be of particular use to the airframe industry, where there is a growing trend toward the use of machined, integrally stiffened structures such as large wing panels, which previously have been made from sections, each section consisting of a large number of pieces riveted together.

On the giant Trentwood stretcher, the amount of stretch given each plate can be accurately controlled. Uniform strain is exerted over the entire plate at one time, resulting in uniform properties in plate. Other flattening methods work a local area progressively.

Plate stretched by the Trentwood stretcher will go primarily to the transportation, chemical, shipbuilding and aircraft industries. It will take a plate 40 ft. long and 2 in. thick.

TOY PROBLEM SOLVED . . .

Use of pre-coated enamel coil beats lithographed sheets

USE OF PRE-COATED enamel steel coil has enabled Mattel, Inc., Los Angeles toy-makers, to triple production and save $5,000 in labor costs in one year in manufacturing their "Jolly Jacks," of which about 1,250,000 are produced annually.

At the same time, the pre-coated coil solved a stacking and scrap problem which was troublesome when sheet stock was used.

Before the changeover Mattel used lithographed metal sheets, 30 x 28 in., which were sheared into 4 in. wide strips. The strips were stacked and then transported from the shear to the press, and there fed individually.

Scrap allowance was 2 in. for every 30-in. strip, or about 7%. Additional loss was suffered because of damage when stacking and transporting strip from shear to press.

By contrast, pre-coated metal coil is fed directly into the press through an automatic feed. This automatic feature accounts for the 200% increase in production rate and the $5,000 savings in labor cost.

Enamelstrip Corporation, Allentown, Pa., supplies the steel coil slit to the exact width—4 in.—required for the operation. The stock is .014 in. thick and coated on one side with blue paint. While the tops and bottoms of the music box are metal covered with this color, the sides are of cardboard decorated with gay, four-color, lithographed circus figures.

A wide variety of finishes is available—alkyds, ureas, alkydureas, oleoresinous, vinyls, formaldehydes, sanitary lacquers, epons, plastics and semi-plastics, and adhesives.

The pre-coated coil produced at Enamelstrip comes in colors ranging from one end of the spectrum to the other, permitting fabricators to select those best suited to their products.

Mattel's savings in production costs are typical of the experience of many fabricators who now use pre-coated metal coil, according to Enamelstrip Corporation.

Use of coil stock does away with shearing of sheets and stacking of strips. Automatic coil feeds permit faster press speeds and enable one man to handle several presses at one time.

The savings from increased production is augmented by lower scrap loss. With strips cut from sheets, scrap is lost at each end of the strip. With Enamelstrip, this loss is confined to the beginning and end of the long coil. Furthermore, strips sheared from sheets do not always cut out evenly. This adds to the scrap loss. Enamelstrip coil, however, can be supplied in the exact width to fit the job.

For the fabricator who has been using bare metal in his operations, the switch to pre-coated coil stock solves paint shop problems.

In some cases, it eliminates the paint shop entirely—reducing insurance and overhead costs.

It takes care of seasonal or one-shot production orders; thus there is no need to expand facilities or staff.

It puts an end to jobbing out fabricated parts to be dipped or sprayed.

METALS AND METALWORKING —special section

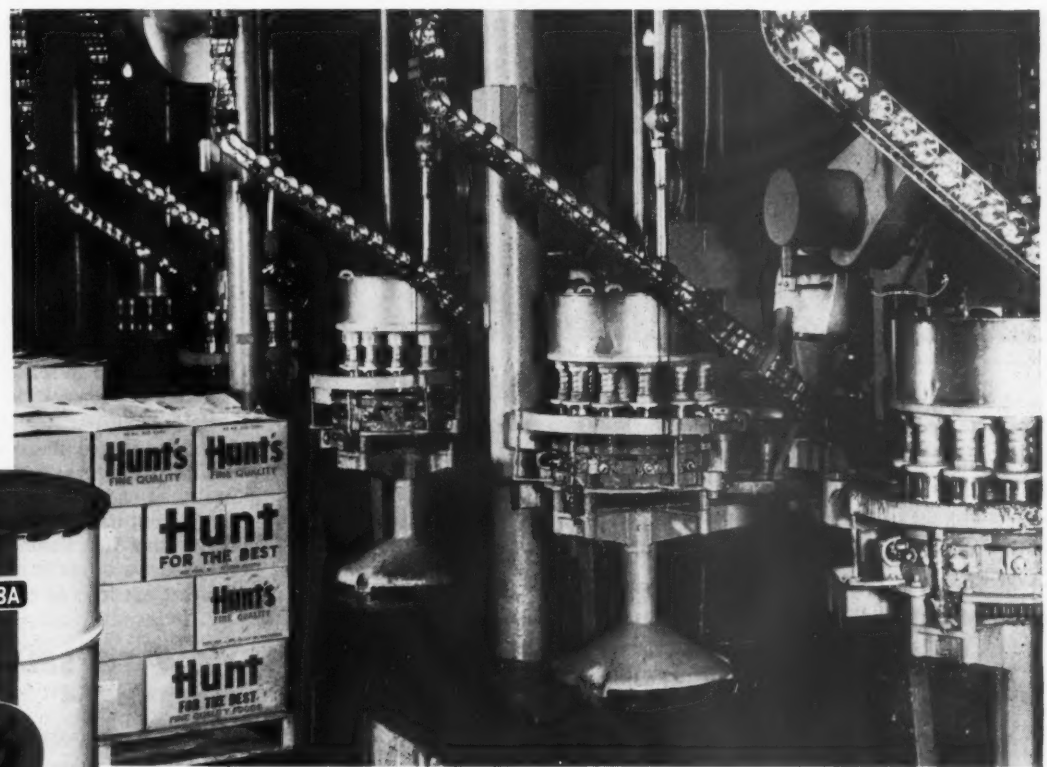
L. W. Waters, Maintenance Supervisor
Hunt Foods, Inc.
Fullerton, California

"Hunt for the best"— it's UNOBA

"We had a severe problem with bearing failures before we started using Union's UNOBA grease in our numerous canning machines packing Hunt's tomato sauce, pork and beans, peaches and other fruits and vegetables.

"Hot sauce and moisture, which tend to find their way into the carbon steel roller bearings on the seamer rolls and wash out the lubricant, were subjecting these vital parts to corrosive action and excessive wear. To counteract this we asked our Union 'lube engineer' to recommend a grease with great retentive quality plus high temperature, water and corrosion resistance. He supplied us with UNOBA *F-1* which has more than satisfied all of these requirements. Using this fine product generally throughout our entire plant is helping to keep maintenance costs low in a business where dependability and low operational overhead are so important."

If you have lubrication problems involving heat, water, corrosion or any combination of these conditions, you need a grease that really "stays put"— UNOBA. Call your nearest Union Oil Representative.



UNION OIL 76 COMPANY
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • New York: 45 Rockefeller Plaza • Chicago: 1612 Bankers Bldg. • New Orleans: 644 National Bank of Commerce Bldg. • Atlanta: 401 Atlanta National Bldg. • Kansas City, Mo.: 921 Rialto Bldg.

NAT'L ASSOCIATION of Manufacturers

"NORTHERN California's outstanding apprentice," Duval Kugler of Fresno (center), received special recognition when the National Association of Manufacturers held a luncheon in San Francisco's Palace Hotel honoring their 1954 president, Harold C. McClellan of Los Angeles, president of the Old Colony Paint & Chemical Co. (left). Kugler, a machinist's apprentice at Valley Foundry & Machine Works, Fresno, was awarded a certificate of achievement from NAM, presented to him at the luncheon by James A. Folger (right), president, J. A. Folger & Company, San Francisco, who was luncheon chairman.

PREPACKAGING palaver

WESTERN STATES Meat Packers Association in their recent meeting in San Francisco viewed the problems centering around the pre-packaging of meats with such sage and revealing comments as these:

"No prepackaged meat has an indefinite shelf life like a can of tomatoes; we're out to sell fresh meat, not embalm it."

"Hard to say what the optimum size for prepackaged meat is; we've got 8-ounce packages and even 6-ounce packages and I've heard somebody's coming out with a 4-ounce package of sliced ham. If it's more than one slice they'll have to cut it so thin you can see through it."

HOW TO SELL more in '54

THE SAN FRANCISCO Sales Executives' Association is sponsoring a SalesBuilder Clinic for March 23, 24 and 25 at the Scottish Rite Auditorium in San Francisco.

The city's business leaders will join with what is reported to be the greatest array of sales skill ever assembled in the Bay Area, to relate case histories showing the methods used to insure sales volume for their respective firms.

EFFICIENCY KINKS

A HAND dwarfs this miniature total pressure probe as a technician shows how it is used to measure air flow through turbomachinery made at AiResearch.

MINIATURE PROBE measures air flow

A TINY pressure probe built out of .072 and .018 tubing has been devised by AiResearch Manufacturing Co. of Los Angeles to measure air flow through turbo-machinery.

Inserted into small, high-speed machinery, the probe, a miniature reproduction of larger external probes, measures total pressures within a cone of 100 deg. and at velocities reaching the speed of sound.

A Levin lathe equipped with a delicate forming tool cuts the proper angles in the .012-in. wall of the tube to form a venturi section. This makes possible an accurate reading of the air flow from any angle within the 100-deg. cone. A .018 tube taken from a hypodermic needle pierces the wall of the larger tube and curves into the airstream to carry the total pressure to a monometer, where it is recorded for test laboratory technicians.

The probe had to be small enough to prevent disruption of the rapid flow of air through air ducts. The larger manufactured probes would not only turbulate the air, but would even create shock waves in air flowing at the speed of sound. Since accurate recording instruments could not be purchased, they were developed in the instrumentation laboratory of AiResearch.

The use of this probe for internal instrumentation of turbo-machinery further improves efficiency of small gas turbine motors, refrigerator turbines and other small air and gas turbines.

PALLETS ON WHEELS ease handling

COLOTYLE Tyle-Bord, Inc., Seattle, moved shipping and warehouse facilities to another building several blocks from their factory. This produced a handling problem in that several thousand feet of predecorated wallboard had to be moved from the production line to a warehouse one mile away.

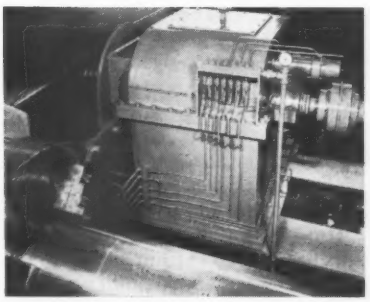
A solution to the problem, saving many manhours of materials handling labor, involved the use of pallets set on casters. Extra heavy pallets measuring 4 x 4 ft. and 4 x 6 ft. to handle the crates, weighing 280 lb. each, were constructed and ball bearing swivel casters mounted on the corners. The pallets were then placed at the end of the packaging line and filled with crates of wallboard after packaging.

When pallets were full they were stored on wheels until the truck could get around to them. The truck was equipped with 3-in. channels laid in the bed, spaced to coincide with the spacing of the casters on the pallets. The full pallets were then rolled from the landing platform directly onto the truck for delivery to the warehouse. At the warehouse pallets were rolled off the truck, or if the floor level didn't coincide with the truck bed, the unloading was accomplished by fork lift truck. Finally, wallboard was unloaded from pallets at proper storage bins.

OPENING sealed drums by application of an electric screwdriver and pliers.

DRUM OPENER a time saver

A NEW METHOD of opening sealed drums at Convair's San Diego division cuts ten minutes off the drum opening procedure. The drum is strapped in a rack where an electric screwdriver and pliers are applied. The rack also enables one worker to remove packing from inside the drum when opened without having another worker hold the drum. Various sizes of drums may be placed on the rack.



CLOSE-UP of speed increaser on 124-ft. long trepanning lathe.

SPEED INCREASER permits quick shifting

A SPEED INCREASING device that permits a quick shift between a low-speed and a high-speed range is an unusual feature of the 124-ft. long trepanning lathe at the Torrance, Calif., plant of The National Supply Co.

The lathe is used in the industrial products division for work requiring high speed, deep hole, precision boring. Penetration rates in excess of 4 in. per min. on a 5½-in. diameter hole, 26 ft. deep, are commonplace. Holes up to 8⅞-in. diameter, in lengths over 40 ft., have also been successfully trepanned on this lathe.

Trepanning at National Supply was first developed on a conventional 16-in.

Contributions wanted

For each contribution to Efficiency Kinks which the editors feel merits publication, *Western Industry* will be happy to award $5.00. Please send in any details of how your plant solved some problem of design, production, maintenance, or process.

We are particularly interested in ideas that contribute to the efficiency of production and the reduction of operating costs, novel or new methods of pollution reduction and waste utilization as well as adaption of old tools and processes to do new jobs.

Send all contributions to Efficiency Kinks Editor, *Western Industry*, 609 Mission Street, San Francisco 5, Calif.

boring and turning lathe with a special speed-up device for increasing the speed of the work piece. Limitations of this improvisation were recognized, however, and the engineering department designed the present lathe, which provides three prime requisites for successful trepanning, i.e., adequate horsepower to the spindle, a high spindle-speed range, and high cutting fluid pressures and volumes.

Power from a 150-hp. variable speed direct current motor is transmitted to the headstock and workpiece through a two-speed gear box and a multiple V-belt drive. In the high-speed range, 250 to 1,000 rpm., the motor is coupled through the gear box in direct drive to the driving pulley. For low speeds, the power from the motor is transmitted to the driving pulley through helical gearing in the gear box, resulting in a speed range from 70 to 280 rpm. An air-actuated cylinder, located in the gear box and controlled by a three-position selector on the operator's side of the machine, permits the shift between the high-speed and low-speed ranges and into a neutral position.

Power is transmitted from the driving pulley to the spindle by means of 25 V-belts, size D. The spindle and spindle pulley is an integral unit and is carried in two tapered roller bearings—a double row at the chuck end and a single row of them at the opposite end.

DISCARDED PLASTIC put to use

A NEW Boeing Airplane Co. developed plastic, unable to meet the requirements for its intended use, has been put to work making joggling tools with a consequent saving of time and money.

Joggles, of which there are many in a modern airplane, are small step-like offsets formed in metal. Until recently, each die and punch used to form them was made of steel and laboriously finished by hand. Now, with "Dunnlew" used as a facing for their working surfaces, finishing time has been cut to a fraction of what it was.

As first visualized for the joggle application, dies were to be of solid plastic, but a trial run disclosed too much give, and it was decided to rough the tools out of steel and use the plastic as a facing, a modification that proved completely successful.

WESTERN DEMAND for electronic engineers

PRESENT DAY graduates of the electronics engineering department at California State Polytechnic College, San Luis Obispo, no longer need to go East for employment. Reason for this is the growth of the electronics industry in California.

Average starting salaries received by Cal Poly engineers during 1953 compared favorably with those received by graduates of Eastern engineering schools. Only 19% of the graduates have left California and more than 25% work in aircraft electronics.

AIRCRAFT WORKER collects $7,777

LEONARD BARENS, a tool and die maker at AiResearch Corp.'s defense plant in Phoenix, Ariz., made a suggestion relating to his work which proved so effective that the company awarded him a suggestion-box award of $7,777.77. This was far and away the largest award of its character ever made in Arizona industry, so far as is known.

PACIFIC NORTHWEST quality control

METHODS of producing products or services of guaranteed quality will be discussed at the Second Pacific Northwest Conference on Quality Control, April 2 and 3, at the University of Washington, Seattle. Programs and registration forms may be obtained from Norman W. Steele, Jr., 701 No. 100th Street, Seattle, Wash.

The conference will offer training sessions on basic and advanced quality control techniques featuring papers by Prof. Eugene L. Grant, Stanford University, Dale Lobsinger, United Airlines, Denver, and Eugene Goddess, Boeing Airplane Co., Seattle. In addition, H. T. Broderson, Johns-Manville Co., Pittsburg, Calif., will show his company's film "Modern Quality Control."

The conference is sponsored by the Seattle section of the American Society for Quality Control in cooperation with the Colleges of Engineering and Business Administration, University of Washington.

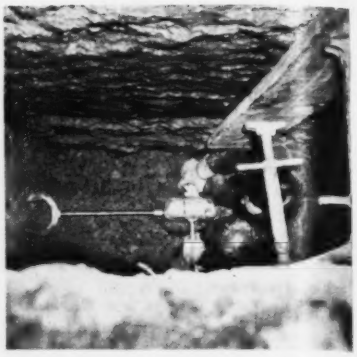
TUBE DRAWBENCH is West's largest

IN AN EXPANSION of facilities designed to meet the West's increasing demands for steel tubing, the Pacific Tube Co. of Los Angeles has installed the biggest tube drawbench west of the Mississippi.

The 150,000-lb. bench, manufactured by the Aetna-Standard Engineering Co., will enable Pacific to draw steel tubing to a maximum length of 52 ft., with an outside diameter as great as 6½ in. The drawbench itself is a single chain, single draw, double mandrel rod, two speed drive type. It has an overall length of 121 ft., and its 400-hp., 230-v. DC motor can draw tubing at 110 ft. per minute. Operation of the new bench, which greatly increases Pacific's drawing range, is almost entirely automatic.

SCHOLARSHIP ON air conditioning and refrigeration

FUNDS to cover a full 4-year scholarship in air conditioning and refrigeration have been presented to California State Polytechnic College of San Luis Obispo, Calif., by Drayer-Hanson, Inc., Los Angeles. This is the only curriculum and 4-year scholarship offered in the country that leads to a B.S. degree in the field.



TUNNELING operation on a Los Angeles sewer line was accomplished in 25% of the normal time with a Super Hole-A-Matic digging and tunneling machine.

INDUSTRIAL EARTH BORING...

Proper equipment will pay its way

MANY WESTERN plants and industries have a certain amount of earth boring to do, or at least when equipped to do a moderate amount of earth boring, find it saves much labor as against other methods of setting poles, posts, piling, anchors, etc.

Where only an occasional vertical or inclined hole is to be bored for such purposes, ordinary post hole augers, kept at some convenient point, will suffice.

Some of the more modern of these tools are provided with high carbon steel blades, and have large boring capacity with a minimum amount of effort. They are designed to bore in either wet or dry soil without any accompanying suction. Non-adjustable augers of this type are available from some sources of supply in any desired diameter from two to 16 inches. A size of auger should be employed which removes no more earth than necessary for the particular purpose.

This type of auger is mounted at the end of a straight shaft and has a cross handle at the top, so it may be turned manually. One adjustable auger of this general type, considerably used for setting posts, piling, etc., will bore holes anywhere from 8 to 15 inches in diameter. It is also provided with extension handles, so it can be used for boring to depths as great as 10 feet.

Where it is desired to bore many holes of moderate diameter to only moderate depth, as in rapid setting of fence posts and similar work, application of an earth boring attachment has been made to one of the modern

chainsaws. The earth boring bit is revolved by power, being controlled by two men who simply allow it to penetrate the earth to the desired point, then lift it free of the hole produced.

Where industries have requirements for larger amounts of earth boring, and over a larger diameter range, such as holes for poles, piling, wells, anchors, etc., or horizontal holes for sewers, conduit, water, oil and similar lines, earth boring equipment employed often incorporates its own power plant.

The power plant for some earth-boring layouts can be mounted either on a truck or on a light tripod for drilling vertical holes. The drill will readily penetrate through frost, tough soil, gumbo, etc.

Drills for use with such equipment are available in single lengths which can be attached together as work progresses. Therefore, it is possible to drill holes anywhere from a few feet up to hundreds of feet in length.

Where to get them

- Post hole augers of the manually operated type, having a cross handle at the top, made of high carbon steel and so designed that round, clean holes can be produced in wet or dry soil without suction, and with a minimum of effort; also the adjustable manually operated augers mentioned which will bore holes from 8 to 15 inches diameter, and which can be provided with extension handles for boring as deep as 10 ft., may be obtained from Iwan Brothers, Inc., 1500 Prairie Ave., South Bend, Indiana.

- The modern chainsaws which have an earth boring attachment, controlled and used by two men for boring relatively small-diameter holes to relatively shallow depth at speed, are a product of Mall Tool Company, Chicago 19, Illinois.

- Earth boring equipment incorporating its own power plant, which may be mounted on a truck or a light tripod to bore vertical holes, and which incorporates drills in single lengths that can be attached together as the work progresses and as need appears for drilling long holes, is available from Ka-Mo Tools, Inc., 1800 South 55th Ave., Cicero, Illinois.

FIELD WAREHOUSING . . .

Inventory financing provides many Western firms with badly needed operating capital

THE GROWTH of field warehousing as a credit tool of Western industry is keeping pace with the expanding economy of the entire Pacific Coast area.

Developed initially as a means of collateralizing inventories of canned goods in the early 1920's, field warehousing has been recognized by bankers and industrialists alike as a credit facility of remarkable flexibility, and as such has answered a need for many of the business firms who are contributing much to Western industrial progress.

There is hardly an industry which does not have one or more field warehouses in operation. To single out a few for statistical attention, best estimates are that there are some 150 field warehouses operating for the canned goods industry in the West; 50 units in the wine industry; 200 serving the lumber mills and yards; 75 warehousing various metals in bars, plates, sheets and ingots, and 50 more engaged in storing frozen food products.

The field warehouse companies claim that any inventory which is storable and which has a determinable value can be field warehoused, and the resulting warehouse receipts negotiated to a bank as collateral for a bank loan. Most of the loans so obtained are used for working capital purposes by the borrowing firms. This widespread applicability of the procedure is the basic reason why inventory financing is being used by more and more business firms who find that today's inflated costs of doing business and continuing high corporate taxes have seriously depleted their operating cash.

In the wholesaling of structural steel, for example, most firms who warehouse steel against expected orders find the number of sizes and shapes of bars, beams, and plates they are forced to carry in stock has increased in direct proportion to the expansion of their business.

The cost of this inventory, delivered on the Coast, has almost doubled in the last decade, while taxes have prevented the accumulation of reserves sufficient to meet the need. To many in this industry, field warehousing has been the answer. It has made possible the carrying of large and complete stocks without undue strain on the firm's working capital position.

Following is a brief summary of developments in industries that presently use this type of inventory financing to a greater degree than before.

Appliances

Field warehousing is being used on the distributor level considerably. In many cases it was found to be less costly than trust receipt financing. Manufacturers, especially in television, have used field warehouses established on their distributors' premises. This enables the manufacturer to ship larger amounts to the distributor and retain title to such merchandise through the warehouse receipt. The

distributor benefits from this arrangement, since he need not finance the inventory nor make payment for individual items until sold.

Lumber

The greatest single increase in use of field warehousing has developed in the fir industry. The redwood and pine operators have utilized warehousing to carry lumber while being air dried for many years. The fir industry has more recently used field warehousing to finance log stockpiles that must be built up during summer months for winter production, when the price of lumber normally rises.

Plywood

Here again the use of field warehouse receipts has become a prime source of funds to enable the stockpiling of peeler logs for winter production. The strain on working capital caused by high cost of peelable logs and the number of such logs needed to maintain full production in the mill has caused many large plywood manufacturers to turn to warehouse receipt financing.

Pulp and paper

Both credit and sales divisions of the larger fiber and container manufacturers have worked in close harmony in using field warehousing installations at their customers' canneries. These suppliers have benefited by the increased shipments of cannery supplies direct to the warehouseman at the cannery location. The supplier retains title by accepting warehouse receipts in lieu of payment. The cannery secures normal discounts, has the supplies on hand and makes payment as they are to be used in cannery. Frequently rail car shortages at peak periods during busy summer months cause shortages of fiber cases and containers. The shipment of extra supplies of these commodities in advance of need directly to the warehouseman has relieved this situation considerably.

Frozen foods

This industry uses the warehouse operation in the same manner as the canning industry. Since most frozen foods are packed during a three-month period when fruits and vegetables are in season, and must then be held by the packer during the balance of the distribution period, the strain on working capital is quite apparent. Field warehouse receipts placed with regular banking connections enable the packer to borrow a large portion of his costs. The loan is then retired as the goods move into consumer channels.

FURNITURE CLINICS held by the S. P.

SOUTHERN Pacific Co., in cooperation with Trans-Continental Freight Bureau, has recently completed 73 furniture clinics at 30 of the principal stations on the railroad's Pacific lines.

Freight station employees were shown how damage claims on furniture can be prevented. Special attention was paid to proper methods governing acceptance, handling, stowing, loading, unloading and delivery of furniture. Also discussed were inspection-reporting techniques for damaged goods.

The clinics used colored strip films, descriptive leaflets and scaled furniture models to inform over 1,500 Southern Pacific employees, including claim inspectors, warehousemen, truck drivers, helpers and their immediate supervisors, as well as a number of operating officers.

MANAGEMENT DEVELOPMENT conference coming

THE SEVENTH Annual Conferences on Personnel Administration and Managerial Development will be held at the California Institute of Technology in Pasadena from June 20 through July 2.

The group of conferences consists of four 1-week discussions. The first, to be held June 20 through June 25, is on supervision of engineering, scientific, and technical employees. At the same time, a conference will be held on management and supervision of office personnel. During the week of June 27 through July 2 a conference will be held on selecting and appraising employees. A fourth conference is being held during the same week on wage and salary administration.

PG&E USES TV in power plant

TELEVISION is being used to save time and increase efficiency in the operation of Pacific Gas and Electric Co.'s Moss Landing steam plant on Monterey Bay, Calif.

The system, known as "closed circuit TV," enables the powerhouse operators to look inside the boiler furnaces from the control room in another part of the plant.

Oil and natural gas are used interchangeably in the furnaces. The switchover from gas to oil, required when the entire system supply is

needed, formerly took 25 min. or more for each of the eight boilers.

Now, with television, the operator in the control room is able to look inside the distant boiler and change all the burners at once in a period of five or six minutes.

The television cameras are mounted against a window in the wall of the boiler and are protected from the intense heat—which ranges up to 3,000 deg. F.—by a high-pressure blast of cold air blowing across the window.

A similar TV installation is being made at the company's Contra Costa steam plant near Antioch, Calif.

WOOD WASTE smog controls

WITH THE ADVENT of smog controls in Los Angeles, all types of burning have been subject to regulation, and although wood waste does not contribute to eye, ear, nose or throat irritants, it is, nevertheless, subject to controls.

Accordingly, the Forest Products Research Society has organized an industry-wide committee charged with fact finding, evaluation of known processes, conduct of such research as may be necessary and the encouragement of industrialization to the extent that firms now producing wood waste will be relieved of their problem.

The committee has entered into an agreement whereby the School of Forestry at the University of California and the California Forest Products Laboratory will conduct various phases of the program. Phase one involves a detailed survey to ascertain facts regarding Los Angeles wood waste and is now under way.

HANFORD WORKS uses 2,120 vehicles

HANFORD Atomic Works, Richland, Wash., maintains 2,120 pieces of automotive, railway and construction equipment and keeps them busy up to 24 hours a day. There are trucks, busses, tractors, locomotives, cranes, and sedans produced by 130 manufacturers making up the Hanford transportation system.

Since plutonium production is spread out within the vast area both for safety and security, Hanford's own transportation must be relied upon to transport all men and materials inside the barriers. In addition, complete maintenance and repair facilities are maintained to assure reliable transportation with consequent smooth production operations.

FILMS AND FILM STRIPS

Ultrasonic testing of metals

Sperry Products, Inc., of Danbury, Conn., has released this 10-minute sound-color film describing development, theory, operation and application of Sperry ultrasonic reflectoscope for non-destructive testing of metals and other materials. Scenes taken in Sperry's research laboratories and customers' plants show latest techniques in ultrasonic inspection, plus excerpts from films on inspection of die blocks and highly stressed parts for supersonic aircraft.

Precision investment casting

A 3-D color slide film series released by Alloy Precision Castings Co. shows company's new metal working process using frozen mercury patterns. A total of about 45 slides show steps involved in making typical mercastings, from die to finished part, of two parts: a valve body for a TV picture tube evacuating pump and a radar wave guide. Arrangements for showing the film to designers, engineers, planning or production executives can be made by writing Alloy Precision Castings Co., East 45th and Hamilton, Cleveland 14, Ohio.

Continuous bronze casting

A new full-color 35 mm. sound-slide film released by American Smelting and Refining Co. has two parts, each 15 minutes long. The first part describes the history and engineering details of the patented ASARCO process for continuous casting of bronze rod, tubes and shapes; the second, typical applications in industry. This slide film is available free from Continuous-Cast Products dept., American Smelting and Refining Co., Barber, N. J.

Modern measuring devices

A new 30-minute color film, "Dynamic Measurement," introduces the layman to dynamic measuring and recording instruments used in science, industry and medicine. Actual applications of such devices are pictured, ranging from vehicle testing to recording blast effects of a nuclear explosion. The film, which was specially produced for the company, may be secured from Public Relations Dept., Consolidated Engineering Corp., 300 North Sierra Madre Villa, Pasadena 15, Calif.

ECONOMICAL HEATING WITH HIGH TEMPERATURE WATER . . .

Combined with high pressure, it embodies advantages of steam without its disadvantages

By ARNOLD D. BOGART, Representative, American Hydrotherm Corp., Los Angeles

HEATING with hot water can be traced back many centuries. However, the more recent variation in the application of this type of heating has been in the use of high temperature, high pressure (HT-HP) water systems. This is simply hot water under pressure, where the operating pressure is slightly higher than the saturation temperature.

This system has been used extensively in Europe for over 25 years, in many types of installations. These include large space-heating industrial installations, as well as schools, hospitals, shopping centers and many other projects.

Long on advantages

As will be shown later, the high temperature water system has all the advantages of the properly designed steam system, yet it is without inherent disadvantages peculiar to steam. Its advantages become greatest when used for installations where heat loads are 20,000,000 to 25,000,000 Btu. per hour and over.

Water in this type of system is usually in the 280-420 deg. F. range. It can be produced in a heat exchanger, utilizing steam from various prime sources, or by the use of direct fired boilers, as in any conventional steam system. High temperature water is circulated throughout the desired installation by means of a high temperature water pump and is then returned to the boiler, completing and remaining a closed cycle.

A comparison of a high temperature water system with a conventional steam system presents the following advantages for the high temperature water system:

1. Smaller boiler can be used.
2. Smaller pipe lines are needed. (Figure 1.)
3. Lower heat losses are encountered.
4. Better fuel economy is obtained.
5. Internal scale or corrosion in condensate return lines is negligible.
6. Boiler, pipe lines and equipment repair bills are reduced greatly.
7. Need for steam traps, pressure reducing valves, etc., is eliminated.
8. Water hammer effects are eliminated.
9. Leakage losses are almost negligible.
10. Make up water demands are greatly reduced.
11. Feed water treatment is not required.
12. Close control and regulation of temperature is possible.
13. Large pressure drops are eliminated.
14. Boiler peak loads can be reduced.
15. The design of the piping system is much easier.
16. Distribution lines can operate in any elevation, eliminating the need for pitch of the lines.

All these advantages add up to the saving which can be outlined as follows:

1. *Capital investment,* due to the smaller boiler, smaller pipe size, is *about 18% to 20% less* than that of a comparative steam system.

2. *Operating costs,* due to greater fuel economy, elimination of heat losses and reduced needs of make-up water, lower operation costs by *about 25% to 30%.*

3. *Repair and maintenance costs,* due to elimination of steam traps, pressure reducing valves, condensation return lines, etc., are *reduced by 80% to 90%.*

As an illustration of the possible savings that could be expected by the use of high temperature water system, the following figures are presented (1950):

PROJECT:

Space heating system, for an installation involving 16 buildings, located two or three miles apart, with a total heat load on the buildings of approximately 91,000,000 Btu. per hour.

Central low pressure system was not considered due to large distances and elevations between buildings, making it very impractical and costly. Therefore the comparison is limited to the central high temperature water system and individual low pressure steam plants.

Total capital investment:

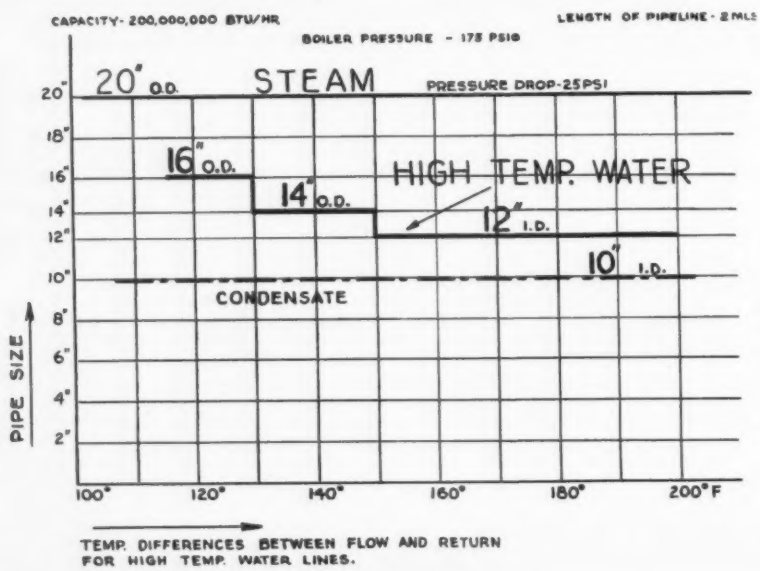
Central high temperature water plant	$475,000
16 individual low pressure steam plants	$711,000

Total operating cost (including fuel, repair, labor, interest and amortization):

Central high temperature water plant	$158,000
16 individual low pressure steam plants	$234,000

These figures are fairly indicative of the potential savings possible with the use of high temperature water system for large district and space heating in-

Steam and high temperature water lines compared



stallations. For more detailed design information, and costs of construction, it is suggested references (1) and (2) be consulted.

Recently, the Department of the Navy, through the Bureau of Yards and Docks, suggested that the District Public Works Officers present and propose the use of high temperature water heating systems to the architects, engineers and contractors in their respective districts. One of the more recent installations under that program is a central heating plant for the Great Lakes Naval Station, Illinois, which heats about 20 to 30 buildings, scattered over an area of two to three miles.

Navy outdone

The recommendations of the Navy have been followed even further by the Corps of Engineers, United States Army, and the Department of the Air Force, whose recent high temperature water installations include the following:

1. Lockbourne Air Force Base, Ohio (approximately 95,000,000 Btu. per hour).
2. Dover Air Force Base, Massachusetts (approximately 300,000,000 Btu. per hour, over a distance of 2 to 3 miles).
3. McGuire Air Force Base, New Jersey (approximately 540,000,000 Btu. per hour, for heating several hundred buildings in an area scattered over 3 to 4 miles).
4. Mountain Home Air Force Base, Idaho (approximately 120,000,000 Btu. per hour, over a distance of 2 miles).

These installations are just a small part of many high temperature water heating systems in the United States and Europe which are becoming more and more attractive to the architects and engineers and their clients, due to their economy, simplicity and controllability.

References:

1. "Heat With Liquids," Paul L. Geiringer, Chief Engineer, American Hydrotherm Corp. *Chemical Engineering Magazine*, October 1950.
2. "Heat Distribution in Group Housing Projects with High Temperature Water," Paul L. Geiringer, Chief Engineer, American Hydrotherm Corp.
3. "High Temperature Water Heating System," Stephen Senko, Personal Products Corp. *Industry and Power Magazine*, 1950.
4. "High Temperature Water System," T. W. Reynolds. *Heating and Ventilating Magazine*, September 1952.
5. "High Pressure Hot Water at Air Base." *Combustion Magazine*, 1950.
6. "Extra-Hot Hot Water Will Heat Widely Separated Buildings." *Industry and Power Magazine*, September 1951.

COOLER WATER INCREASES RUBBER PLANT EFFICIENCY. . .

Water chiller, supplemented by cooling tower to provide condensing, does the trick

CIRCULATING chilled water is required in many operations in manufacturing precision rubber products at the Arrowhead Rubber Company, a division of the National Motor Bearing Company in Downey, Calif. These products include rubber hydraulic sealing "O" rings, rubber components for "National" oil seals, and silicone rubber products which have a greater high-temperature and low-temperature resistance than conventional organic rubber sealing rings.

Triple needs

Chilled water is needed in three operations in the plant: (1) in the slab mill, (2) in the press line, and (3) in the extruder. When Arrowhead first built its new modern, streamlined plant, cold circulating water was provided by an evaporative condenser system which proved to be unsatisfactory. The efficiency of the cooling unit varied with atmospheric conditions, and it was difficult to reduce the water temperature sufficiently and keep it within the critical limits required.

Industrial and air conditioning engineers from the Southern California Gas Company in Los Angeles discussed with plant and maintenance engineers at Arrowhead the possibility of installing a water chiller to do the water cooling job. Together the engineers decided that the best way to find out the advantages and the workability of the suggested installation was to try a little experiment. In the discussion they hit upon an interesting and novel idea: to test the advantages of cooler temperatures, why not load the present system with ice at the rate of 25 tons a day?

This experiment was actually carried out—not only at the rate of 25 tons but later at the rate of 50 tons of ice a day. Such use of crushed ice would not, of course, have been practical as a "steady diet," but it proved the point. Cooler water enabled the plant to increase the efficiency of the rubber manufacturing process.

Thus Arrowhead's engineers and management saw the advantages, and became definitely interested in installing a 25-ton Servel Water Chiller. They were even more impressed when they found that the proposed unit could operate on steam generated by the plant's boilers which supply the steam used throughout the rubber plant. A Marley cooling tower replaced the evaporative condenser to provide condensing water for the chilling unit.

Automatic operation

Because the chiller operates automatically and requires a minimum of maintenance, it was installed above the main boilers to save valuable floor space. The entire unit was mounted on a steel platform over the steam boiler.

The refrigeration unit is of the absorption type, hermetically sealed,

CHILLED water is supplied to an extruder machine for silicone rubber manufacture.

using water as the refrigerant and lithium bromide as the absorbent. The unit operates under a very high vacuum.

To uphold quality in the finished rubber products, all factors must be closely controlled at Arrowhead, including temperature in the milling operation. In the mills where the uncured rubber stock is processed, considerable heat is generated by friction, and the temperature at which these mills operate must be kept below critical limits.

"The installation of the water chilling unit has not only solved the cooling problem," says C. P. Evans, vice president and general manager, "but in addition saves approximately 50 pounds of valuable rubber stock each day. The waste was the result of scorching on overheated rubber rolls. Since the unit has been put in operation, mill production has been increased 50% due to the fact that overheating and the interruption of production to cool the mill rolls has been eliminated."

The water, chilled by the unit to the desired temperature, circulates inside the mill roll, dissipating the heat generated by friction in the milling operation. In the mill raw rubber stock is replasticized and then stripped off in sheets of the proper thickness.

In some molding operations where the presses are alternately heated to curing temperature and cooled, the chilled water has shortened the cycle to increase production 35%. Chilled water is also needed to control the temperature of the extruding machine in the manufacture of silicone rubber. The barrel of the extruder is water-jacketed, and the cooling water is supplied by the Servel unit.

NEW EQUIPMENT & MATERIALS

USE RIP-OUT POSTCARD for more information on products introduced this month

1

Pocket-size geiger counter

Accurate and sensitive in detecting radioactivity, this precision instrument provides continuous or intermittent service. Used in conjunction with earphones, it is designed as a civil defense aid for plant or office. Made of heavy gauge steel with blue hammertone finish, it weighs only 11 oz. *Circle key number on ripout postcard for more information.* Micro Specialties Co.

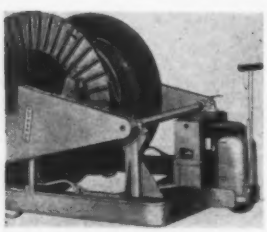
2

Solenoid operated valves

Simplicity, versatility, and long life are features of Modernair solenoid-operated, four-way, five port valves for low pressure systems. Metals used in internal parts and body are brass, stainless steel and aluminum. *For specification sheet 11-A-24, circle key number on rip-out postcard.* Modernair Corp.

3

Reel handling truck



This new truck, with electric hydraulic lift, is designed for general factory and warehouse use or can be used as a stand for rolling or unrolling a reel. Unit's travel speed is 2½ to 3 mph. with two speeds for forward and backward movement. *Circle key number on rip-out postcard for additional information.* The Moto-Truc Co.

4

Magnetic sweeper aids maintenance

When used as a hand-propelled rolling sweeper along factory aisles, floors, drives and walks, Sweeperette's powerful Alnico V magnetic tube is passed over small metal chips, filings, nails and tacks, making them jump to rotating tube and automatically spread over its surface to a depth of ¾ in. All models are claimed completely water and oil proof. *For additional data, circle key number on rip-out postcard.* Eriez Manufacturing Co.

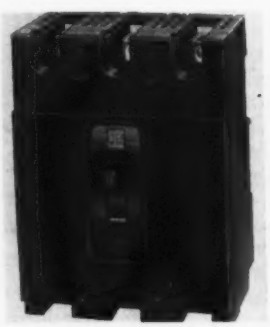
5

For separating coarse from fine material

Centriclone classifier employs a fluid velocity said to average three times that which is mechanically feasible by conversion of pressure to kinetic energy. It will go to town on sub-sieve sizings, and on thick slurries where high velocity is necessary to obtain desired results in presence of considerable viscosity. *For technical sheets, circle key number on rip-out postcard.* Equipment Engineers, Inc.

6

Break that circuit



With a new design in 1-, 2-, and 3-pole construction, I-T-E 100-ampere "E" frame circuit breaker can be used in panel-board, switchboards, load centers, and all types of individual enclosures. Because of compact, over-all design (conventional "E" frame size) and mounting arrangement, new breaker saves installation time and space. *For technical information, circle key number on rip-out postcard.* I-T-E Circuit Breaker Co.

7

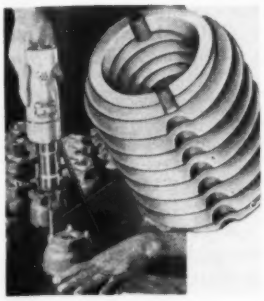
Nylo-Roll conveyors . . .

. . . will be welcomed by industries where brine, alkali and acid conditions cause repeated failures of ball bearing type

conveyors. They are available in standard 11½, 15, 18 and 24-in. widths, lengths as desired, equipped with 2-in. zinc grip coated rollers in gravity or live roller types. *Circle key number on rip-out postcard for more information.* Metzgar Conveyor Co.

8

Threaded insert for fast screwdriver installation



New screw-in, steel WEG insert provides a permanent thread anchor for bolting metal to metal, wood, and plastic. Consisting of one part, it is safely locked in position with pins. WEGs are slotted for screwdriver installation in sizes through ¼ in. *For more detailed descriptive material, circle key number on rip-out postcard.* Roylyn, Inc.

9

Peg-Board . . . versatile and strong

This shelving comes eight ft. high and four ft. wide. Distributed load capacity per shelf for light-duty type is said to be 500 lb.; for heavy-duty type, it is 1,000 lb. No special tools required for assembling. *For literature and specifications, circle key number on rip-out postcard.* Robco, Inc.

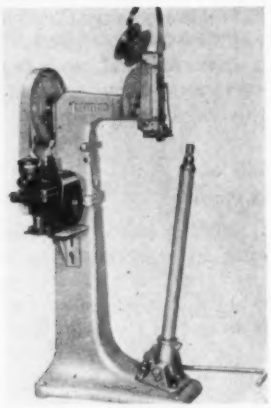
10

What you'll get with a "liftmaster" . . .

. . . Ford "134" engine, Ford transmission and clutch, Lockheed brakes, Hydreco hydraulic system, and a Clark differential. In addition there will be single-drive wheels with oversize extra-ply nylon tires. Special equipment, such as side-shifters, clamps, and special forks, are available. *For specification folder, circle key number on rip-out postcard.* B. B. Miller Co.

11

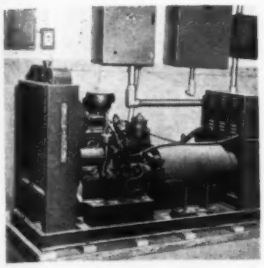
Gas-driven stitch in time



A new gasoline-operated motor drive is now available on Bostitch's No. 14 and No. 148 box and bottom stitchers. Wire stitching can be done in locations where electric power is not to be had. Stitcher location can be changed without necessity of arranging for electrical connections. *For detailed information, circle key number on rip-out postcard.* Bostitch.

12

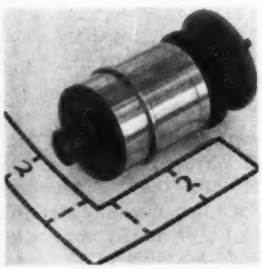
Low-cost kilowatts with "pedigreed" horsepower . . .



. . . is combination offered in a new generator series powered by Chrysler industrial engines. Series includes three sizes of 50, 30, and 20 kw. ratings. Each unit is a complete, packaged electric power generating plant ready for operation. *For additional product information, circle key number on rip-out postcard.* Ready-Power Co.

13

Self-adjusting clutch



Here is a new friction clutch capable of self-adjusting for both wear and expansion. Unit is claimed able to replace any electromagnetic friction clutch. It has already been adapted to manufacturer's latest gyro servo designs and will be used in future clutch applications. *For more detailed information circle key number on rip-out postcard.* Summers Gyroscope Co.

NEW EQUIPMENT . . . Begins on page 104

14

New wood joiner

Tu-Bolt, a new type of connector for joining wood, is essentially a tube inserted in a bolt hole and flared compressively at both ends. Here is strength with less metal—a neat joint without cumbersome projections. Applications include building frames, panels, transport bodies, trusses, and laminations. *For additional information, circle key number on rip-out post card.* C. W. Lyman.

15

Plastics for precision production and faster fabrication

Two new families of paper-base phenolic laminated plastics are said to offer excellent physical, electrical, and mechanical characteristics—yet meet rigorous punching and staking requirements. One is a hot punching laminate and one a cold punching material. *For more complete information on these products, circle key number on rip-out postcard.* Taylor Fibre Co.

16

This electraulic stationary liftable . . .

. . . is developed to feed sheets or molds into varying levels. Operator rides right along with deck. Machine is available with explosion proof equipment if needed. Automatic-type increment controls may be had. Unit illustrated has 1,200-lb. capacity with 36 x 48-in. platform. *Circle key number on rip-out postcard for more technical data.* Service Caster & Truck Corp.

17

For the creative product and design engineer

Microcast is a precision investment process for manufacture of intricate design castings where surface smoothness and close tolerances are mandatory. Process utilizes both arc and induction melting. Parts are said to require little or no machining. *For brochure on process, circle key number on rip-out postcard.* Austenal Laboratories, Inc.

18

Heavy-duty towing tractor

Clarktor-75 is a new field-tested heavy-duty towing tractor with a maximum drawbar pull of 7,500 lb., designed for general purpose industrial application, as well as for specific uses by airlines and aircraft companies. It features steering ease, ease of entrance and exit and attractive appearance. *Circle key number on rip-out postcard for additional details.* Clark Equipment Co.

19

Visibility and versatility in bulk handler

Model 20 Shoveloader, with a 12 cu. ft. bucket, is a basic bulk handling tool for factories, foundries, mills and general maintenance and contract applications. It will lift 1,500 lbs. to seven-ft. height and will turn in a 90-in. radius. *For complete description and specification sheet form no. AD-60, circle key number on rip-out postcard.* Baker-Lull Corp.

20

Portable, low-cost threading machine

No. 142 Featherweight Champ is a new, low-cost power drive for hand pipe tools which weighs in at 75 lbs. Available with either gas or electric power, this equipment has a threading range of ⅛ to 2 in. *For a fully illustrated, factual booklet on Featherweight Champ, circle key number on rip-out postcard.* Oster Manufacturing Co.

NEW EQUIPMENT . . . Begins on page 104

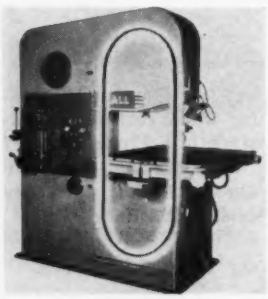
21

Model of a Towmotor

A small working model of Towmotor model 480-P fork lift truck is a new development to help industry plan and work out materials handling and warehousing problems on a scale basis. Forks lift or lower, mast tilts, and model rolls on rubber tires. *For additional data, circle key number on rip-out postcard.* Towmotor Corp.

22

For reduced production machining time



New DoAll band machines are designed to give power and rigidity necessary to extract maximum benefit from use of firm's high-speed steel saw bands. Machines are utilized for repetitive, mass-production operations employing hydraulic feeds, tool coolant systems, variable tool velocities and other features. *For technical charts and additional information, circle key number on rip-out postcard.* The DoAll Co.

23

Here's a real reel

This 8-in. x 1,200-ft. reel uses standard NARTB hub to eliminate tape stretch, breakage, and pitch changes as tape approaches reel's end. Firm also markets a 14-inch reel, designed especially for long-playing applications, which hold 4,800 feet of tape. *For additional information, circle key number on rip-out post card.* Ampex Corp.

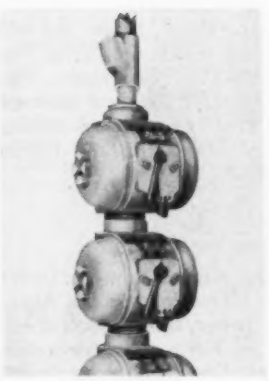
24

Copper plated gears and a new name

All orders received on and after Jan. 1, 1954, by *Brad Foote Gear Works, Inc.*, will be copper plated. Process is said to prevent corrosion before gears are put in service and to eliminate need for greasing. Also, copyrighted tradename, Certified Brad Foote Gears, is being applied to all company products.

25

Appleton's new line



Here is a complete new line of explosion-proof, dust-type, rain-tight circuit breaker, motor and line starter combination enclosures. Appleton "Unilets" carry U. L. approval and, with a new U. L. approved sealing Unilet, may be joined in combination to meet U. L. requirements in certain sizes. Bulletin 12-A presents U. L. approval details and further information. *For your free copy, circle key number on rip-out postcard.* Appleton Electric Co.

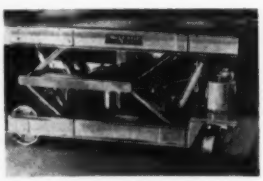
26

Long-lived insulation resin

"Scotchcast" electrical insulation resin No. 3 is a new epoxy type electric insulation resin with a usable life of from three to five days before setting up. Curing time is from two to four hours at 250 deg. F., with a longer cure at lower temperatures. *For technical bulletin covering properties and use of this product, circle key number on rip-out postcard.* Minnesota Mining and Manufacturing Co.

27

For handling heavy dies



This new hydraulic lift table is said to accommodate loads up to five tons, raising them up to 42 in. Handling heavy dies, machined parts or sheet steel, unit raises load straight up from 26 in. above floor level. Table is moved easily. *For more information on this lift table, circle key number on rip-out postcard.* West Bend Equipment Corp.

NEW EQUIPMENT . . . Begins on page 104

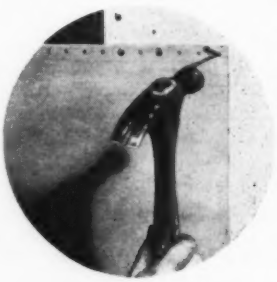
28

Sturdy hose for transferring liquids

A new solvent-handling hose with high resistance to methyl ethyl ketone, acetone, methyl acetate and other alcohols and esters of petroleum is serviceable for suction applications as well as simple discharge. New hose utilizes a Thiokol tube and heavy-duty tank-car type construction. *For detailed information, circle key number on rip-out postcard.* Hewitt-Robins Inc.

29

Stop damage at car doorways



An economical answer to jamming and consequent damage at car doorways, is use of retaining strips—heavy, waterproofed kraft paper laminated over two bands of steel strapping. Visible nail holes simplify nailing these 18 x 88 or 108-in. long strips and make them fit snugly against doorposts, filling gap and keeping lading from side shifting into doorway. *For a two-color descriptive folder, circle key number on rip-out postcard.* Signode Steel Strapping Co.

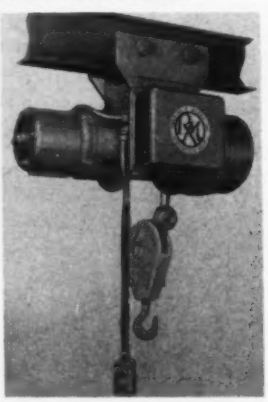
30

Electrostatic air-cleaner

Precipitron is an electronic device that removes 90% of airborne dust and pollen. Designed for simple installation, unit is claimed effective even against tobacco smoke particles. *Send for further information by circling key number on rip-out postcard.* Westinghouse Electric Corp.

31

Hoist hits market



Available with either two-speed or single speed push button magnetic control, type J-3 electric wire-rope hoist has a rated capacity of two tons. Magnetic, disc-type motor brake automatically opens when hoist starts and closes at current shut-off. Comes with plain, hand geared or motor driven trolley to meet any application needs. *For more information, circle key number on rip-out postcard.* Robbins & Myers, Inc.

32

Hydraulic power . . . many pressures and capacities

Denasco hydraulic power unit is a basic design for industrial service which can be modified to provide a completely packaged power system. All units are said to con-

form to or exceed JIC standard specifications. Ample fabricated steel reservoirs are suited to application in extreme conditions of dirt and humidity. *For more details, circle key number on rip-out postcard.* Ditzen Engineering & Sales Co.

33

Answer to special cleaning problems

Detrex 800 series is a group of phosphoric acid-type cleaners intended for products too large or heavy to be phosphate coated with normal production methods, and for manufacturers whose production does not warrant elaborate equipment for phosphate cleaning. Cleaners will be especially compounded to meet particular requirements of each installation. *Circle key number on rip-out postcard for additional information.* Detrex Corp.

34

Precision-built coil winder

Although model W coil winder is made primarily for rapid production of progressive universal type coils, it will also wind a variety of other coil types. Range of ratios available for driving cam is continuous from more than 25-1 down to 1-500 without special idlers. *For complete specification folder, circle key number on rip-out postcard.* Tri-State Supply Corp.

35

Warning system for permanent magnets

Magnalarm does its "thinking" by a sensitive ferrometer which constantly measures tramp iron quantity as it accumulates on surface of magnetic separator. Circuit re-

action trips alarm as soon as a predetermined accumulation is reached. Standard alarm types are optional as well as alarm locations. *For complete information, circle key number on rip-out postcard.* Eriez Manufacturing Co.

36

Avoid cargo and compensation claims

Tacco truck stair is a new device said to prevent injuries and cargo damage because it enables worker to walk up and down stairs from body instead of climbing or jumping. Patented stair is self-retracting. For use, trip tempered spring steel snap latch, pull out stair, and you are all set. *For a 4-page descriptive brochure, circle key number on rip-out post card.* E. D. Bullard Co.

37

For simplified strapping

New hydraulic stretching and sealing tools for centralized package strapping include: power unit, hydraulic stretcher and sealer, and electrically powered band dispenser. Features include: reduction in operator fatigue; and stretcher design permitting use of strapping directly from coil. *Circle key number on rip-out postcard for additional information.* Acme Steel Co.

38

Towing tractor refined

New 1954 model of TC-60 Payloader towing tractor has refinements and modifications claimed to contribute greater ease of control, convenience and usefulness without sacrificing compactness of design, maneuverability and a 6,000 lb. drawbar pull. *For full details on this towing tractor for airports, plants, yards and docks, circle key number on rip-out postcard.* The Frank G. Hough Co.

39

For better dust collecting

Newly developed Amerjet dust collector is a reverse jet fabric collector designed for those applications where extremely fine particles are involved or where material must be collected in a dry state for reclaiming. This equipment maintains a steady air volume at exhaust points and permits high velocities through cleaning tubes. Bulletin 279 tells all about it. *For your copy, circle key number on rip-out postcard.* American Air Filter Co.

HELPFUL LITERATURE

40

New Aircospot information

This folder details features of new inert gas-shielded spot welding gun. Gun is completely described with illustrations, physical and electrical specifications and operating data. *Air Reduction Pacific Co.* ADC 834

41

Bulletin describes gooseneck booms

Gooseneck booms designed in dimensions and capacities to be used in conjunction with Yale gas and electric fork trucks of from 1,000 to 10,000 lb. capacity or with Yale Worksaver motorized hand trucks are described in bulletin 1570. *The Yale & Towne Manufacturing Co.*

42

Bulletin JD tells about punching

Type JD hole punching units for punching mild steel up to ¼ in. thick are presented in this folder. Dimensional drawings for 2⅛ and 3-in. wide units are accompanied by tables of standard punch and die sizes for round holes. *Wales-Strippit Corp.* JD

43

Bakelite vinyl dispersion resins

Typical uses, properties and methods of applying Bakelite vinyl resin-base organosols, plastisols and plastigels are presented in this new eight-page booklet. List of company sales offices is presented on last page. *Union Carbide and Carbon Corp.* J-752

44

Winter issue of "Handling Materials Illustrated"

Lead-off story is a synopsis of a certified job study made at The F. & M. Schaefer Brewing Co.'s Brooklyn plant. Illustrated with on-the-scene photos, article describes how mass handling is speeding up truck loading. Emphasis is placed on special palletizing methods, a new two-level route truck, and a trailer with a built-in skate wheel conveyor. *Towmotor Corp.*

45

Bulletin on engine-type synchronous motors

Standard construction features of Allis-Chalmers engine-type, low-speed synchronous motors in ratings of 100 hp. and larger at speeds of 450 rpm. or less are presented in this two-color bulletin. Material is illustrated with photographs. Modifications are given. *Allis-Chalmers Manufacturing Co.* 05B8008

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41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120

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New products and manufacturers' booklets reviewed in *Western Industry* are screened and selected for your needs. The advertisers in *Western Industry* call your attention to important services and developments available to Western firms in this period of dynamic growth. Take this opportunity for aid in keeping your business in step with this growth.

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46

For getting today's inventory today

Complete details of electronic Speed Tally and how it functions in inventory record-keeping are described in a new folder. Features and characteristics are presented. *Remington Rand Inc.* EL148

47

Features of a floor machine

Two-color catalog sheet, on new Premier all-purpose floor machine, gives machine features, outlines applications and economies and illustrates accessories available. *Premier Co.* PRF

48

Slide lock details

Here is a bulletin describing new SlideLok self-locking device for use with Trouble-Saver sectional steel scaffolds. Used to fasten diagonal cross braces to scaffolding frames, device speeds up erection and dismantling. *The Patent Scaffolding Co., Inc.* PSS-32

49

Story of stay-dry insulation

A new 24-page guide to Foamglas lists condensed specifications for material application in walls, ceilings, and in low temperature space insulation. Physical properties, characteristics, and performance data are fully covered. *Pittsburgh Corning Corp.* 37B

50

Latest issue of "Power Points Digest" . . .

. . . comes in a new pocket-size format. This 16-page, two-color edition describes various standby and mobile applications of model CW electric generating plant. *D. W. Onan & Sons, Inc.* Vol. 10, No. 1.

51

The latest on dust collecting

A two-color bulletin describing unit type CN cloth bag dust collector tells how dust control for all types of finely divided dry dusts can be provided for smaller volume applications at low equipment and installation costs. Technical data is presented in chart form. *Pangborn Corp.* 916

52

On taping motors

How Scotch brand electrical tapes speed up electric motor construction and repair is discussed in a new 12-page illustrated booklet. Included are specifications for 10 different electrical tapes for a wide variety of insulation and holding applications. *Minnesota Mining and Manufacturing Co.*

HELPFUL LITERATURE

for the plant operator who wants to keep informed

53

Data to help you save on electric motors

Consolidated price lists, descriptive data, and general information are attractively presented in a brad-fastened brochure for Master electric motors up to 150 hp. *The Master Electric Co.*

54

"Fleet Transportation Costs Can Be Reduced!" . . .

. . . through Equipment Trust Fleet Leasing. And with this statement to prove, brochure goes ahead to explain plan, to discuss and make comparisons. Final page summarizes advantages. *Lee Fleet Management, Inc.*

55

On patching floors

Here are two folders to help you get on top of that broken-down-floor problem. One is on Horn NuWay resurfacer, a pre-mixed patcher, and one is on Horn Crete-Fix for quick and economical patching and resurfacing of concrete floors. *A. C. Horn Co., Inc.*

56

Steel guide

This handbook gives properties of sections rolled on individual mills of each of Bethlehem Pacific's three steel plants. It includes a list of specialties manufactured by this concern. A steel wire gauge table is included with split gauge numbers and decimal equivalents. *Bethlehem Pacific Coast Steel Corp.* 305-A

57

Rubber products for industry and agriculture

Brochure is made up of specification charts, photos, and price lists for solid tires, retreads, scrubber matting, sizing spools, tubular rollers with rubber bushings, and pulley lagging. Firm says, "If it's rubber we can make it." *Holz Tire & Rubber Co.*

58

Moore Dry Dock hits print

Designed to serve as a reference to be used in placement of orders, this brochure also presents application photographs that could point to a reduction in cost of your own operations. Company motto is, "Services and facilities to meet the industrial needs of the expanding West." *Moore Dry Dock Co.*

59

Material on automatic voltage stabilizers

Points covered in this 12-page brochure include: why voltage varies; how to get stable voltage; where to use G-E automatic voltage stabilizers; how to apply them; and specifications. Photos and two-color graphs illustrate. *General Electric* GEA-5754

Circle key number on rip-out card for literature you want

60

Movable metal walls—'54 style

New in format and subject material organization, Mills Movable Metal Walls catalog for 1954 is a 68-page book of detailed information on flexible interiors for offices, factories, and schools. Fully illustrated with diagrams and photographs. *The Mills Co.* 54

61

Money-saving by metallizing

Current issue of "Metco News" briefly describes applications of metallizing on nineteen worn machine parts and industrial structures in a variety of industries. Application photos illustrate each point. *Metallizing Engineering Co., Inc.*, Vol. 6 No. 12.

62

"For Electrifying Results" . . .

. . . is title of an edifying folder explaining Cadweld process, a method of welding copper to copper, or copper to steel in which no outside source of heat is required. Application photos and parts drawings aid in presentation. *Erico Products, Inc.*

63

"Design of Hot Tap Tee Connections in High Pressure Pipelines"

This 52-page ASME paper No. 53-PET-31 deals with problem of making branch connections to highly stressed transmission and distribution lines without interruption of fluid flow. A design approach aimed at keeping stress levels around branch connections in harmony with stress levels common in high pressure pipelines is suggested. *Taylor Forge & Pipe Works.* 533

64

Folder on Autronic differential pressure transmitter

Type D2T transmitter is described in detail and data is presented on principle of operation. Bulletin is illustrated with hook-up and schematic diagrams, phantom-cutaway views, and dimensional diagrams. *The Swartwout Co.* A-707-A

65

"1954 Aluminum Mill Products Design" . . .

. . . is a 12-page publication listing, in condensed form, detailed technical information on Reynolds Aluminum mill products. Data is included on characteristics of aluminum, standard alloys, tempers and sizes of aluminum sheet, plate, wire, rod, bar, tubing, pipe, extruded and architectural shapes. An alloy selection guide is given plus fabricating and finishing suggestions. *Reynolds Metals Co.*

HELPFUL LITERATURE

66

How fiber glass reinforced plastics hold up

Results of extensive tests on wet-strength of chemically treated fiber glass reinforced plastics have been published in a booklet from Fiber-Glass division of *Libbey-Owens-Ford Glass Co.* Included is information on roll of Garanized fiber glass in plastic laminations.

67

Fork types

Here is a sheet of fork truck attachments, for use with SpaceMaster electric fork trucks, that is complete with diagrammatic drawings, specifications, and descriptive text. Material covers pallet, chisel, saber, and paper-roll forks, tubular crane arm and coil lifting ram. *Lewis-Shepard.*

68

"New Tools for Loggers" . . .

. . . is an informative eight-page brochure that will help logging men keep production costs in line. It describes and illustrates machines specifically designed to give high speed with rugged power — Tournarch and Tournaskidder. *LeTourneau-Westinghouse Co.* G-1165-1053

69

Vapor barrier book for your reading

Eighty-page publication gives complete recommendations for vaporsealing insulation on low temperature vessels. It contains fifty-four illustrations showing exactly where and how coating should be applied and covers three major classes of insulation. *Insul-Mastic Corp. of America.*

70

Watch your time records improve

IBM time recorders 780 and 2500, versatile enough to permit recording of employees' IN and OUT attendance as well as recording amount of time spent on individual jobs during working hours, are described in two folders now available. Features, and reproductions of time cards are included in each. *International Business Machines Corp.*

Circle key number on rip-out card for literature you want

71

Info on furnace melting

A new bulletin on Simplex melting furnaces contains photographs plus specifications, diagrams, performance and other technical data. *Lindberg Engineering Co.* 29

72

Fast battery-need calculator for electric industrial trucks

A simple, direct, and time-saving method for determining size battery required for any electric industrial truck installation is now available. Three charts are used in system: one for travel current; one for lift and tilt current; and one for ramp current. *Automatic Transportation Co.*

73

Handbook on air compressors

This comprehensive guide introduces Binks' new air compressors which bring the line to 27 sizes in five types. Compressor buyers will find data in this 16-page book helpful in selecting unit most suitable for their requirements. *Binks Manufacturing Co.* 810

74

Chemical process booklet

Acid adsorption with Duolite A-7 anion exchange resin is subject of this 16-page brochure. Publication is illustrated with performance graphs. Included is a table of standard data for water deionization in addition to a list of chemical process company resins. *Chemical Process Co.*

75

Sheet weight chart . . .

. . . on Columbia-Geneva Steel gives data about U. S. S. uncoated sheets—

hot and cold rolled, vitrenamel, and black plate and on U. S. S. galvanized sheets—galvannealed and paintbond. Chart is sturdy with metal eyes for easy hanging. *United States Steel Corp.* 1069

76

Material handling equipment additions

Here is a specification sheet describing Arr-O-Roll Jr. (steel) and Arr-O-Rolite (aluminum) conveyors, latest additions to *Arrow Products Inc.'s* line of M-H equipment. Information covers: straight sections; curves; and supports to be used with these new light-weights.

77

"Meehanite Metal as a Gear Material" . . .

. . . is a 36-page booklet covering all aspects of this statement with photographs, drawings, specification charts and technical information. A chart on comparative data for gear materials is included. *Compton Foundry.* 42

78

On industrial machine tools

This 72-page publication is filled with information on band, circular, and scroll saws; belt abrasive finishing, cut-off, deburring, and disk abrasive finishing machines; drill presses; grinders; jointers; wood lathes; motors and switches; planers; wood and metal shapers; and welders. Includes specification data, photographs and a separate price list. *Rockwell Manufacturing Co.* AB 53

79

Air conditioning the pulpit way

This folder describes a Pulpit air conditioner designed and developed for use in industrial control areas where heat, dirt, or fumes create hazardous working conditions. Mechanical features are listed plus tables of capacities and dimensions. *Dravo Corp.* 1307

80

Two-step time delay relay described

This two-color illustrated bulletin describes model NET Agastat time delay relay. It checks off operating sequences, lists typical applications, and includes wiring diagrams and mounting dimensions. *Elastic Stop Nut Corp. of America.* SR4

81

"Newsy" steel stock list

Ziegler Steel Service Corp.'s monthly stock list now sports a front page of this-and-that and bits of worth-while reading material. If you would like to

HELPFUL LITERATURE

be on firm's mailing list for this "stock report," circle key number on rip-out postcard.

82

Twenty pages of flexible couplings

Lovejoy's line of flexible couplings get a complete treatment with photographs, line drawings, and charts of specifications and dimensions and operating capacity in hp.-varying rpm. Two tables (load and torque conversion) are included. *Lovejoy Flexible Coupling Co.*

83

"How to Grind and Polish Magnesium Alloys"

This seven-page bulletin includes grinding wheel recommendations, a table of typical procedures for polishing, and text and line drawings on dust collection. There is also a list of six safety precautions. *Norton Co.* 532

84

All about new type vapor-wrapper

Applications, performance data and specifications on new Nox-Rust "instant acting" Vapor-Wrapper, a chemically active volatile corrosion inhibitor, are detailed in firm's new catalog. *J. W. Guthrie Co.*

85

On an automatic power scoop

Bulletin presents a new scoop designed for one-man operation in unloading bulk material from box cars. Features are listed; line drawings give dimensions; and specifications are included. A drawing shows typical arrangement of scoop unloading, using open eye and universal sheaves. *The Jeffrey Manufacturing Co.* 863

Circle key number on rip-out card for literature you want

86

Lubricating equipment, accessories, and supplies . . .

. . . are presented in this hole-punched, two-color publication. Mechanical features, specifications and descriptive material are accompanied by parts photos. A fitting comparison guide and tables of Graco coupled hose lengths are included. *Gray Co., Inc.* 201

87

Details of a 2,000-lb. capacity fork truck

F-26T, a 2,000-lb. capacity fork truck designed for fast tiering, is described in a new folder. Machine is available in two models: one with a 68-in. lift for freight car and truck loading; and one with an 83-in. lift designed for high tiering. *Elwell-Parker Electric Co.*

88

Goodrich way of splicing transmission belts

A 32-page illustrated handbook, on how to splice rubber transmission belts with Plylock belt joint, illustrates each procedural step by photographs. Featured is a series of convenient tables for figuring endless belt lengths and time required to vulcanize belting of various thicknesses and types. *B. F. Goodrich Co.*

89

"Petroleum Products For Every Use" . . .

. . . is a booklet in which Tide Water describes its various petroleum products. Subjects include fuels, motor oils, heavy duty oils, Veedol preservative oils, gear lubricants, greases, and heat-

ing oils. There is a table of recommended application of Veedol high detergency, Tydol HD, Tydol HD S-1 and Tydol HD S-2. *Tide Water Associated Oil Co.*

90

Flat transmission belt applications . . .

. . . are described in this four-page, fully-illustrated bulletin. Company's complete line of flat transmission belts are presented by listing recommended uses, specifications, construction data, sizes and lengths. *H. K. Porter Co., Inc.*

91

About forging and casting

Handbook describes hammered forgings, composite die sections, and cast-to-shape tool steels produced by Forging and Casting Division. It outlines forged shapes available, stainless and tool steel, weight limits, analyses. Diagrams of standard shapes are included. *Allegheny-Ludlum Steel Corp.*

92

Red-wooden tanks

Photographs, drawings, text, and tables throughout 48 pages do a dandy job of presenting facts on wooden tanks. There is a section on tank usage and charts on U. S. gallons in rectangular and round tanks and on weights of steel bars. *George Windeler Co., Ltd.* 48

93

Strapping the Brainard way

All 12 pages of this brochure are illustrated with photographs and with specifications shown in tabular form. Contents include tensional, heavy duty, and manufactured strapping; tensional and heavy duty strapping tools; accessories and seals; and company service. *Sharon Steel Corp.*

94

On valve selection and maintenance

A new booklet, "Getting The Most Out of Your Valves," covers selection of valve types and materials, installation and operation hints, as well as inspection and maintenance pointers. *The Cooper Alloy Foundry Co.*

95

Swing is toward automation . . .

. . . and, in 24 illustrated pages this brochure discusses following functions of automatic production control: controlling tension, acceleration and deceleration, and velocity and peripheral speed; synchronizing one or more machines; maintaining uniform pressure, temperature, liquid level, and flow. *Reeves Pulley Co.*

96

Data sheet on enclosed reset switch assemblies

This hole-punched single page presents pictures of each device with specifications. Equipment covered includes: sealed plunger actuator; roller arm, sealed plunger actuator; overtravel plunger, roller arm, and roller plunger actuators. Discount dope included. *Minneapolis-Honeywell Regulator Co.* 69

97

Bulletin on screw thread inserts for five thread types

Folder illustrates how threads that have been stripped or worn can be repaired with Heli-Coil screw thread inserts. Five tables show how to select proper insert to repair and match National Coarse, National Fine, pipe, automotive and aircraft spark plug threads. *Heli-Coil Corp.* 654

98

Issue finder and a new issue

A four-page index, listing all issues of "Hewlett-Packard Journal" from Sept., 1949 through Aug., 1953, is now available. Also offered is volume 5, No. 1-2 of -hp- Journal discussing proven techniques for making common mechanical measurements quickly and accurately with electronic counters. *Hewlett-Packard Co.*

99

Bases covered

A circular from *Elliott Manufacturing Co.* presents features of firm's new cast iron and pressed steel bases.

HELPFUL LITERATURE

Photographs in conjunction with detailed specification table present complete details. 226

100

Technical folder on rust-inhibiting coating

A two-color folder fully describes Rustmaster, pictures and presents typical applications, and gives complete technical data regarding its proper usage. *General Paint Corp.* 5309

101

Heat pump bulletin

In a bulletin on a new all-electric heat pump, each new feature of this equipment is described including elimination of flame-type fuels, water connections and seasonal adjustments. Use of existing ductwork is discussed as well as possible locations of either a three or five hp. unit. *Westinghouse Electric Corp.*

102

"What's New In Safety"

Vol. 14, No. 1 of this bi-monthly publication features Bullard fiberglas safety hats and caps in molded-in colors and shades to work in with standardized or individual company color safety codes. Article starts off with basic colors of Safety Color Code as approved and recommended by American Standards Assn. *E. D. Bullard Co.*

103

"Delta Radial Arm Saws"...

. . . are thoroughly covered in this 8-page brochure from *Rockwell Manufacturing Co.* Photographs supplement specification data and technical tables. Each piece has its own catalog number. A numerical price list is included. M-54

104

"Johnston Unit-Line Sump Pumps"...

. . . is an 8-page bulletin presenting construction details, head and capacity tables, dimensions and other technical data on a pre-engineered packaged line from which a pump can be selected for existing conditions or for new construction. *Johnston Pump Co.* 1029

105

On economical removal of emulsified oil

Here is a new illustrated 8-page brochure on use of Sorbo-Cel, a specially treated Celite diatomite filter aid for removing emulsified oil from condensate or process water. Publication tells how this product works, describes types of filters used, and includes step-by-step directions on operation of a Sorbo-Cel filtration system. Case histories are included. *Johns-Manville.* FA-46A

106

Concerning variable speed transmission

Here is a 12-page bulletin on installation and care of Reeves variable speed transmisssion with synchro-differential control. Copy and diagrams cover operation, installation, specifications, dimensions and parts for s.d. control, and flexible shaft and gears. *Reeves Pulley Co.* G-5311

107

"Bethlehem Tool Steels—Special Purpose Grades"...

. . . is a new illustrated booklet describing 15 Bethlehem tool steels under five different special-purpose grades. Specialty grades included cover analyses which are not so widely used and which have a more limited application than standard types of tool steels. *Bethlehem Pacific Coast Steel Corp.*

ATOMIC ALCHEMY...

Concrete from sea water and coral for AEC

SUCCESSFUL structural concrete using salt water and coral aggregates has emerged from its experimental phase and has been used in large quantity by Holmes & Narver, Engineers-Constructors, in the design and building of facilities required by the Atomic Energy Commission Pacific Proving Grounds.

Seven years of experience with such concrete in Pacific ocean areas have proven formulas and controls developed by the Los Angeles firm to be adequate for all conventional usage to which normal concrete is adapted. Compressive strengths up to 4,000 psi. are commonly achieved.

Since all fresh water must be distilled from sea water at this location and is at a high premium, the successful use of salt water in concrete batch plants solved a serious problem.

SPRING MAKERS stress service

DURING a recent meeting of the Pacific Spring Manufacturers' Assn. at Pebble Beach, Calif., members reviewed progress made to date in achieving the original purpose of the group: better service to the spring users of the West. Typical of efforts in this direction is the agreement among members to provide for interchange of wire stocks among firms without penalty. This means that spring users in this area may now be assured of a far larger inventory available than could be carried by a single spring manufacturer.

LIVESTOCK SAFE from Alcoa fluorine

MAJOR FINDING reported by a team of Oregon State College and State College of Washington agricultural experiment station workers was that small amounts of fluorine escaping from the Aluminum Company of America's Vancouver, Wash., plant are not enough to harm livestock on the 24-sq. mi. island lying about 9 miles northwest of Portland.

Farmers on the island requested in early 1951 that OSC and WSC accept research grants totaling $152,755 from Alcoa to find out if new scrubbers installed in the aluminum company's factory reduced escaping fluorine gas to safe levels.

PUBLICATIONS FOR SALE

Bacon's Publicity Checker, 1954, published by Bacon's Clipping Bureau, 343 So. Dearborn, Chicago. $6. The 1954 edition of this publicity aid has a total of 2,850 listings of business papers, farm journals and consumer magazines. Publications are listed both alphabetically and classified into 99 market groups. Information includes address, editor, frequency of issue, date of issue, circulation and publisher. Book also includes a section on preparing releases and handling editorial publicity.

Transcript of Pressed Metal Institute's Fourth Annual Spring Technical Meeting, from Pressed Metal Institute, 2860 E. 130th St., Cleveland 20, Ohio. $5, check to be forwarded with order. This 166-page illustrated transcript covers subjects of press guarding, designing safety into dies, the right press for the right job, drilling, tapping and counterboring in the stamping plant, work simplification and die breakage and how to minimize it.

Special Days, Weeks and Months, Chamber of Commerce of the United States, 1615 H Street, N.W., Washington 6, D. C. 25¢. This booklet lists over 400 business promotion events, legal holidays and religious observances. Where applicable, it names sponsoring organization.

The American Economic System, by Edwin Vennard and Robb M. Winsborough, published by Row, Peterson & Co. and distributed to industry by Middle West Service Co., 20 North Wacker Drive, Chicago 6. $1 per copy, with 25% discount on orders for 5 or more copies. This 96-page paper-bound book has the simplicity of a primer but handles big ideas carefully and effectively. Well-designed charts present facts and figures.

Today's Revolution in Weather by William J. Baxter, International Economic Research Bureau, 68 William St., New York 5, N. Y. $1. Cartoons by Virgil Partch are the keynote to this lively 130-page speculation on the weather, which—everyone has noticed—is getting warmer. Scornful of statistics, the author admires the teasing theory, and has even slipped in a few on unrelated topics, such as taxes and diet.

WESTERNERS AT WORK

ARIZONA

San Manuel Copper Corp. and Magma Copper Co.

Wesley P. Goss of Superior, formerly vice president and general manager, is named president of these two firms. He will continue as general manager.

CALIFORNIA

Extruders, Inc.

W. B. Sander, formerly vice president and general manager of this Hawthorne, Calif., firm, is elected company president. He succeeds *W. S. Towne,* elected chairman of board.

Chiksan Co.

Kenneth J. Downs, formerly design engineer, is appointed chief design engineer of company at Brea.

Lockheed Aircraft Corp.

J. A. Thomson is new director of parts and services for this Burbank firm. He was previously manager of sales administration.

Kimball Manufacturing Corp.

San Francisco concern names *John E. Hunt* as supervisor of its purchasing, personnel and accounting work.

Roylyn, Inc.

Henry T. Thomas is appointed assistant general manager of company at Glendale. He comes to Roylyn from Parts Wholesalers, Inc., Los Angeles, where he was general manager.

Robertshaw-Fulton Controls Co.

Thomas H. Jeffers is elected assistant vice president of company and appointed to new position of assistant general manager, Anaheim division, Anaheim. He was formerly chief engineer there.

T. H. Jeffers
Robertshaw-Fulton Controls Co.

L. J. Westhaver
U. S. Steel Corp.

U. S. Steel Corp.

Loren J. Westhaver is newly appointed general manager of operations for Columbia-Geneva Steel Division. *Robert C. Talbott* is named manager-raw materials development, Columbia-Geneva. Formerly assistant manager of same department, he succeeds *H. C. Burrell,* deceased.

Asphalt Institute

Bernard A. Vallerga, formerly of University of California's engineering faculty, is appointed managing engineer of Institute's Pacific Coast division at San Francisco. He replaces *Arvin S. Wellborn,* promoted to position of chief engineer with headquarters in New York City.

Resin Industries

Gale M. Deam, formerly a Johns-Manville executive and, more recently, vice president of Mission Metalcrafters, is named secretary-treasurer of Resin Industries, Santa Barbara, Calif.

Modglin Co., Inc.

D. P. Hayes is promoted to general manager and *Mark G. Simpson* to factory manager and assistant general manager by this Los Angeles manufacturer of plastic and metal housewares specialties.

Telecomputing Corp.

H. G. Ayers is appointed special assistant to president of this Los Angeles concern. He was formerly general works manager for Affiliated Gas Equipment Co.

Kaiser Aluminum & Chemical Corp.

William T. Burns is appointed assistant to general superintendent of Salinas-area plants. He is replaced as Moss Landing magnesia plant superintendent by *Jack D. Moore,* formerly plant superintendent at Natividad works. *J. Ivan Hall* is newly appointed Natividad plant superintendent. He was formerly superintendent at ferro-alloys plant, Permanente.

Lear, Inc.

Frank Squires, formerly of Hughes Aircraft, is named quality manager of Learcal division, Los Angeles.

Food Machinery & Chemical Corp.

William A. Wolff, former works manager of Simplex Packaging Machinery, Oakland subsidiary, becomes regional manager, Western operation, of John Bean division, San Jose. He replaces *George Campbell Jones* who is named divisional assistant to manager of Bolens Products division, Port Washington, Wis. *Arthur J. Olsen* is appointed works manager of Simplex. He was formerly assistant works manager of Canning Machinery division, San Jose.

Kaiser Engineers

Gifford M. Randall is placed in charge of development work on industrial and government engineering and construction projects, West Coast, for this Oakland division of Henry J. Kaiser Co. He will headquarter in Oakland. He has recently acted as project engineer for design and construction of various Kaiser projects.

California Fabricators

Edwin Carlson, formerly superintendent, is named resident manager at Eureka. He succeeds *A. Westburg* who joins Holmes Eureka Lumber Co. as resident manager.

Pacific Gas & Electric Co.

Philip E. Beckman, engineer, is appointed vice president in charge of gas operations. *George H. Hagar* is named vice president in charge of electric operations. *W. G. B. Euler,* executive vice president and former vice president and general manager of company, retires.

Pacific Scientific Co.

Howard O. Rose, formerly assistant treasurer, becomes treasurer of this Los Angeles

WESTERNERS AT WORK

firm. *Edgar E. Clark* is upped from position of assistant secretary to that of secretary. *Walter Balderston* and *Hanson Grubb*, organization founders, retire from active duty.

H. I. Thompson Fiber Glass Co.

William C. Winterhalter is appointed executive vice president and general manager of firm's Los Angeles and Inglewood, Calif., plants. He was formerly with Owens-Corning Fiberglas Corp., Santa Clara, where he served as vice president and Pacific division sales manager.

Bethlehem Pacific Coast Steel Corp.

J. L. Pringle, formerly a marine salesman at concern's San Francisco shipyard, is appointed assistant to general superintendent there.

Food Machinery and Chemical Corp.

Firm at San Jose names *Warren R. Philbrook* to take over position of industrial relations director, left vacant by *Albert C. Beeson* who is now filling an unexpired term on National Labor Relations Board in Washington, D. C. Mr. Philbrook comes from firm's chemical divisions, New York City. His assignment continues until December 1954, coinciding with Mr. Beeson's leave of absence.

Packard-Bell Co.

George W. Fenimore joins this Los Angeles firm as special assistant to president. He comes from Hughes Aircraft Co., where he was executive assistant to vice president and general manager.

Rosenberg Bros. & Co., Inc.

C. F. Zobel, chief of concern's fruit buying operations, is named general manager of firm's new processing plant at Santa Clara. He succeeds *C. F. Lietz*, retired.

Seaside Oil Co.

R. J. Irvin, vice president and sales manager of this Seaside concern, is appointed general manager. He succeeds *Harry A. Jackson*, Seaside's president, who was appointed vice president of Tide Water Associated Oil Co.'s Eastern division.

Douglas Oil Co. of California

James G. Stevens resigns as executive vice president and treasurer and will be succeeded as vice president by *George T. Goggin*, now general counsel and a director.

Hiller Helicopters

Robert A. Wagner joins this Palo Alto company as chief engineer. He was formerly chief engineer of Aircraft division, McCulloch Motors.

Bay Area Air Pollution Committee

Patrick J. Moran is appointed director of Air Pollution Control Program, San Francisco. He was previously associated with American Potash & Chemical Corp., Trona. *W. J. O'Connell* is named Program's engineering consultant.

U. S. Spring & Bumper Co.

Patrick T. Rauen, secretary of this Los Angeles concern, is elected to position of vice president.

Adams-Rite Manufacturing Co.

Robert B. Hicks joins firm at Glendale as assistant to president. He was previously associated with Pacific Airmotive Corp. as manager of commercial aircraft department.

Production Management Engineering Associates

Thomas M. Evans, formerly independent consultant and mechanical engineer in Midwest, is appointed to staff of this management consulting firm with San Francisco headquarters.

C. P. Concrete Equipment Co.

Alfred L. Binz joins firm as district manager, Oakland. He was formerly a sales engineer with Moore Machinery Co., San Francisco, as a sales engineer.

Union Rubber Co. of Los Angeles

J. Arensmeyer is named general manager.

Fargo Rubber Corp.

F. Shor is appointed superintendent and chemist by this Los Angeles concern.

Pacific Electric Railway Co.

G. F. Squires is appointed vice president and general manager of Los Angeles company. He succeeds *T. L. Wagenbach*, retired. *Russell Moebius* is promoted from position of general superintendent to that of assistant general manager.

COLORADO

Climax Molybdenum Co.

C. J. Abrams, Denver, is now head of a newly created exploration division. He is succeeded as general manager of Western operations by *Frank Coolbaugh*, resident manager of operations at Climax.

Shell Chemical Corp.

M. R. Sprinkle, plant superintendent at Denver, is named manager of manufacturing development department, New York.

J. Monson *R. R. Williams, Jr.*
of Colorado Fuel & Iron Corp.

Colorado Fuel & Iron Corp.

R. R. Williams, Jr., is named to assistant managership of concern's mining department. He is replaced as superintendent of blast furnaces at CF&I's Pueblo plant by *John Monson*, previously assistant superintendent. *Robert K. Cramer*, former industrial engineer, takes over position of assistant superintendent of industrial engineering. *Leo Hilt* leaves National Tube, Gary, Indiana, to joint CF&I as new general foreman of firm's seamless tube mill at Pueblo.

IDAHO

Boise Payette Lumber Co.

George Hjort is promoted from position of manager of research and plant development to that of manager of manufacturing division. Headquarters in Boise.

A. E. C.

Dr. Charles E. Stevenson is named technical director of Idaho chemical processing plant at Atomic Energy Commission's national reactor testing station.

OREGON

Hyster Co.

Thomas R. Hazel is appointed to position of supervisor of Tractor Equipment Engineering division. *Ronald A. Johnson* is named supervisor of Engineering Standards division.

General Paint Corp.

L. S. Lewis, formerly superintendent of plant at Spokane, Wash., is appointed Northwest factory superintendent. *V. H. Marchi*, previously assistant plant superintendent, Portland, is named Northwest plant manager. Both will headquarter at Portland.

WASHINGTON

Washington State Institute of Technology

Newly appointed acting director of Institute is *Dean Royal D. Sloan*. He fills vacancy created by resignation of *Dr. W. A. Pearl*.

Trans-Northwest Gas, Inc.

John S. Shute, Portland, Ore., is new president of this Spokane concern. He succeeds *Paul H. Graves*, resigned to become chairman of board. *K. J. Sonney*, formerly company's engineer, is named general manager. Vice presidents are: *B. Hagadone*, Coeur d'Alene, Idaho, and *J. Drumheller* of Spokane.

Libby McNeill & Libby

Olaf Jacobsen of Yakima operation is promoted to position of superintendent. He succeeds *J. P. Lawler*, deceased.

Rayonier, Inc.

Donald E. Lawson transfers to company plant at Fernandina Beach, Florida. He is replaced as resident engineer, Port Angeles, by *F. W. Stolz*.

ASSOCIATIONS ELECT

Northwest Frozen Foods Assn.:

President, *F. Gilbert Lamb*, Lamb-Weston, Weston, Ore.; vice president, *W. P. McCaffrey*, National Fruit Canning Co., Seattle.

Utah Mining Assn.:

President, *J. Parnell Caulfield*, general manager of Kennecott Copper Corp.'s Western mining divisions; first vice president, *Otto Herres*, vice president of Combined Metals Reduction Co., Salt Lake City; and second vice president, *L. F. Pett*, general manager of Kennecott Copper Corp.'s Utah Copper division.

Western Oil and Gas Assn.:

President, *Charles S. Jones*, president of Richfield Oil Corp.; first vice president, *John W. Hancock*, president of Hancock Oil Co.; second vice president, *Lowell Stanley*, chairman of board, Monterey Oil Co.; secretary and acting general manager, *Felix Chappellet*.

Society of Industrial Packaging and Materials Handling Engineers:

Western regional director, *C. L. Lippman*, Columbia-Geneva division, United States Steel Co., San Francisco.

Society of Automotive Engineers, Inc.:

Vice president, aircraft, *F. W. Fink*, Consolidated-Vultee Aircraft Corp., San Diego.

Dairy Institute of California:

Manager, *Harold S. Wakefield* with offices in Sacramento and Los Angeles.

TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Third Ziegler Steel expansion

New facilities at Los Angeles for Ziegler Steel Service Corp. are doubling size of plant and office. Office was designed by Burnett C. Turner, A.I.A.; warehouse addition by D. R. Edwards, consulting engineer. This is third major expansion for this steel warehousing concern, including construction of its original facilities at Los Angeles and an office and warehouse for its Oakland division.

Exide branch manager

Willard W. Grundel, who has been an Exide sales engineering man since 1926, becomes manager of San Francisco branch of Electric Storage Battery Co. He has served as assistant branch manager since August 1950.

Quaker coordinator

A. M. Lowrey is appointed assistant general sales manager, Western division branches, of Quaker Rubber Corp., division of H. K. Porter Co., Inc., Philadelphia. In new position, Mr. Lowrey, who has been with Quaker Rubber for 13 years, will coordinate activities of eight branches including Los Angeles.

Promotions

Ralph Askin, vice president in charge of Oakland branch of Ets-Hokin & Galvan, is appointed by firm as "representative to building trades and special industries." He is succeeded as Oakland branch manager by Frank Gadsby. Mr. Askin, who has been with Ets-Hokin for seven years, was formerly superintendent for Pacific naval air bases, U. S. Navy.

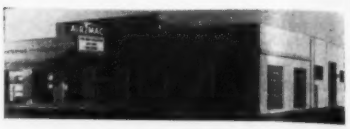
Soulé in Phoenix

New sales and service headquarters in Southwest for Soulé Steel Co. is opened in Phoenix, supervised by District Sales Manager Chris Pettibon, who transfers from Los Angeles. Office serves Arizona and New Mexico customers of Soulé, supplying standard steel buildings, aluminum and steel windows, metal lath and other metal building products.

Westinghouse picks Oregon agent

Tillman and Booth, Inc., Eugene, Ore., is appointed wholesaler agent of Westinghouse electrical apparatus in that area. The 24-year-old firm is headed by C. Philip Tillman, president; Robert P. Booth, secretary-treasurer, and Edward K. Posson, general manager.

Open for business



New building of Air Mac, Inc. of Washington, Seattle materials handling and construction equipment distributor, opens for business after two-day open house. Founded in 1946 as Air Mac Equipment Co., firm was incorporated in 1952 under name Air Mac, Inc. of Washington, covering Washington, Idaho, Montana and Alaska. Twin firm, Air Mac, Inc. of Oregon, serves Oregon and Northern California. Located in heart of industrial district, new Seattle quarters provide larger sales, service, shop, yard, display and parking facilities.

Sales manager for Salt Lake

Oren C. Gilbert is appointed sales manager of Salt Lake district, Union Oil Co. of California, succeeding Richard D. Davis, who moves to New York City as regional sales manager. Mr. Gilbert was formerly district sales manager at Santa Rosa and has been with Union Oil for 25 years.

Ohio Brass representative

William A. Matzke, Seattle, is picked by Ohio Brass Co., Mansfield, Ohio, as its valve sales representative in Washington and Oregon. His sons, William A. and Robert J. Matzke, will assist in serving this territory.

Brammer streamlines service

Brammer Corp., New York, establishes warehouse stocks in Los Angeles, San Francisco and Seattle to provide prompt and efficient service on detachable "V" link belting in West. Stocks are under supervision of following Brammer representatives: James P. McConkey, Pacific Palisades, Calif.; R. & J. Dick Co., Inc., at San Francisco and Seattle.

West Coast headquarters

Detrex Corporation of Detroit, Mich., completes new branch warehouse and office in suburban Los Angeles for its West Coast headquarters. Facilities will serve as headquarters for staff of 8 service and sales engineers serving users of Detrex industrial cleaning equipment, chemicals and dry-cleaning machines. Built by Ted R. Cooper Co., Los Angeles, 10,500-sq. ft. building is equipped with conveyorized materials handling system, an electric-eye device for accurate filling of 53-gal. drums of solvent, a railroad siding and truck loading dock.

Tech-Pacific in full swing

Tech-Pacific Corporation, Newport Beach, Calif., begins operations in 11 Western States as exclusive distributor of several Swedish and American precision machine tools. Founders of firm are Curt W. Bohman and Joseph J. Musil. Mr. Bohman was formerly president and general manager of Columbia Stamping and Manufacturing Corp. and has been with Lockheed, Douglas and Marquardt aircraft companies. Mr. Musil was assistant to officer in charge of Los Angeles regional office of Air Materiel Command, U. S. Air Force.

Plexolite names Zakerian

Plexolite Distributing Co., Inc. of Los Angeles appoints Alex Zakerian as regional sales manager for Southern California. He has been with firm for over two years and was formerly associated with L. H. Butcher Co., Los Angeles. Leon Feldman will retain position of general sales manager in charge of Plexolite's national sales and regional distributing organizations.

Air conditioning chief

Thomas Davenport is named chief sales engineer of air conditioning division of Pacific Scientific Co., working out of San Francisco and supervising activities at all four Pacific Coast offices. Mr. Davenport has been with firm since 1946, in recent years as manager of San Francisco air conditioning division.

Becco man for California

Vernon E. Moore becomes sales representative, with headquarters in Los Angeles, of Buffalo Electro-Chemical Co., Inc., division of Food Machinery and Chemical Corp. Mr. Moore has been with Becco for past year and was previously with Mathieson Chemical Corp. Deliveries of hydrogen peroxide will be made from inventories maintained at Central Terminal Warehouse in Los Angeles and San Francisco Warehouse, San Francisco.

News about Trailmobile

New Denver branch manager of Trailmobile, Inc., manufacturer of commercial truck-trailers, is M. D. Kent, former assistant branch manager at Omaha. He replaces Walter H. Ketel, who has been named assistant branch manager at Chicago. C. J. Strook is appointed West Coast operations manager in Berkeley, Calif., on special assignment. He was formerly assistant branch manager at Syracuse, N. Y.

Changes at Osborn Manufacturing

Osborn Manufacturing Co., manufacturer of power, maintenance and paint brushes and foundry molding machines, moves its Los Angeles office to new and larger facilities at 5413 Whittier Blvd. New quarters will be equipped with special machines for demonstrations, laboratory research and experimental work on behalf of customer job applications. Special representative to aircraft, electronics and radio industries is added to Osborn's staff, in person of Walter C. LaBerge, who transfers from Chicago. Mr. LaBerge has been with Osborn for past 27 years as factory representative and analyst working out of various sales offices.

New Shell appointments

Randolph S. Pope of Seattle becomes manager of Seattle district office of Shell Oil Co. He has been with company 18 years and until recently served as district sales supervisor, a position now filled by Fred Zeller. William H. Hagans, manager of special products section, is now assigned supervision of aviation division in addition to his present duties.

Hydraulic presses and hydraulic lifts

The Rucker Co., distributor of industrial equipment, with headquarters in Oakland and offices in South Gate, Calif., and Seattle, Wash., adds two new lines: hydraulic presses manufactured by Pasadena Hydraulics, Inc., and hydraulic lifting devices of Rotary Lift Co., Memphis, Tenn. C. E. Rucker is

TRADE WINDS

president and C. J. Woodard sales manager of The Rucker Company, whose general territory includes Washington, Oregon, Idaho, Nevada, Arizona and California.

Coulter Steel branching out

Coulter Steel & Forge Co., Emeryville, Calif., opens branch office and warehouse in Seattle, headed by James Baxter, and in Salt Lake City, in charge of Ralph Fugate. Stocks of Timken graphitic tool steels will be maintained in Seattle. Salt Lake City branch, housed in a new building, is reported to provide first stock of alloy and tool steels for Intermountain area.

To head John Bean sales

Ronald G. Clarke is named general sales manager in West of Food Machinery & Chemical Corp.'s John Bean division.

Metallurgical Consultants, Inc.

New firm is organized to offer staff service for consultation, research and development in field of industrial materials and processes, backed by F. J. Robbins, metallurgical engineer, and John J. Lawless, Jr., metallurgist. Mr. Robbins is also president of Sierra Drawn Steel Corp., and vice president of Plomb Tool Co., Los Angeles.

Thomas steps up

L. Wilson Thomas, Jr., is appointed sales training supervisor for Columbia-Geneva Steel division of U. S. Steel, San Francisco. Formerly assistant supervisor of training in Utah operations, he succeeds Donald B. Greenwood, who has been named manager of training and employment service in U. S. Steel's commercial department, Pittsburgh, Pa.

Transfers to Seattle

A. W. Hempelmann is transferred by Monsanto Chemical Co. from California to Seattle as chemical division sales manager.

New post for Peters

Jack D. Peters is promoted to position of sales manager of Jervis B. Webb Co. of California, designer, manufacturer and installer of conveyor systems in eight Western states. Company is a subsidiary of Jervis B. Webb of Detroit.

C. W. Boswell *E. Titlow*
of Robbins & Myers, Inc.

Represent Robbins & Myers

Cecil W. Boswell, manufacturer's representative for Robbins & Myers, Inc., is now handling Moyno pump division, motor division and propeller division sales and service in Northern California area, succeeding H. S. Jones, deceased. New salesman is added to staff, Edward Titlow, who was with Fairbanks-Morse for three years in San Francisco area. Mr. Boswell was associated with Mr. Jones for past five years, and prior to that was employed at R & M factory for one year as sales apprentice.

Comes west for Westinghouse

Arthur S. Davis is appointed regional gearing representative for Pacific Coast by Westinghouse Electric Corp. He transfers to San Francisco office from Philadelphia, where he joined the firm in 1948 and has served as gearing representative since 1951.

More plastics for Ryerson

Joseph T. Ryerson & Sons, Inc., national steel service organization with Western plants in San Francisco, Los Angeles, Seattle and Spokane, adds stock of plastic pipe and fittings produced by Carlon Products Corp., Cleveland. Carlon line of plastic products supplements Ryerson's laminated industrial plastic supplied in sheets, tubes and rods.

Chapel joins Taylor Fibre

Milton Chapel of San Carlos, Calif., is appointed district sales manager for Northern California by Taylor Fibre Co., La Verne, Calif. Headquarters of Taylor Fibre is Norristown, Pa.

Kaiser promotions

A. L. Peake, Jr., is appointed assistant sales manager, southern district, Los Angeles, and A. G. Grey, assistant sales manager, central district, Oakland, for Kaiser Steel Corp. Mr. Peake, who joined Kaiser steel sales staff in January 1948, has been assistant manager of rolled steel sales in Oakland. Mr. Grey, up to now field representative for southern district sales office in Los Angeles, has been with Kaiser since November 1949.

Yeoman for M&T

Arthur Yeoman is appointed sales engineer in arc welding division of Metal and Thermit Corp., New York, with offices in Van Nuys, Calif. His territory covers the area north of Los Angeles. Before joining M&T, he was a welding engineer for the Lombard Company.

First Penflex distributor

Republic Supply Co. of Calif., Los Angeles, becomes exclusive California distributor for Penflex flexible metallic tubing. Manufacturer, Pennsylvania Flexible Metallic Tubing Co., up to now has distributed its products entirely through its own branch offices. Penflex district manager, C. F. Taylor, will have his office at Republic Supply's Los Angeles headquarters. Full Penflex line will be carried at both Los Angeles and San Leandro warehouses of Republic Supply.

Arizona base for Goodrich

New warehouse and office building for B. F. Goodrich, Tire & Equipment Division is ready for occupancy in central industrial district of Phoenix. In addition to warehousing and shipping operations, new headquarters will also be center for tire servicing and adjustment.

New man in South

The Rucker Co. names Bernard Jansen its sales engineer in Southern California area, with headquarters at South Gate plant. Mr. Jansen, prior to joining Rucker, was associated with Barksdale Co. of Los Angeles as production engineer and sales engineer of hydraulic components and systems and, earlier, with Savel, Inc.

Panama Lamp get-together

Panama Lamp & Commercial Co., Inc., holds three-day sales conference at its San Francisco headquarters for company representatives from California, Southwest and Northwest. Conference was held to brief staff members on sales and service policies of company in representing manufacturers of lighting products.

Matthiessen to head L. A. sales

Ira C. Matthiessen is named Los Angeles district sales manager for Columbia Tool Steel Co., Chicago Heights, Ill. Territory includes all of Southern California. Mr. Matthiessen has been with company since 1942.

Protectoseal names Seim

Conrad Richard Seim is appointed Western representative of The Protectoseal Co., Chicago, with offices and warehouse in Los Angeles. Protectoseal safety devices for hazardous liquids will be stocked on West Coast for prompt delivery.

Coles Cranes picks Griffin

Robert H. Griffin is appointed exclusive distributor in Northern California and Nevada for Coles Cranes, Inc., Joliet, Ill. Mr. Griffin was formerly treasurer and sales manager for Glen L. Codman Co., Inc., Oakland.

Third for West Coast

New Southern California office and warehouse is opened in Maywood (Los Angeles) by R. & J. Dick Co., Passaic, N. J. Service center is the company's third on West Coast, including similar facilities at San Francisco and Seattle. Each center warehouses all Dick power transmisssion equipment, gives appli-

CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are ½ inch short of contracted space to allow for borders and composition. Rates are $7.50 a column inch. Copy should be sent in by the 25th of preceding month if proofs are required; by the 28th if no proofs are required.

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TRADE WINDS

cation engineering services, and also acts as sales representative for Atlas roller chains and Sewall roller chain sprockets.

Changes at Howard Supply

W. E. McComas, who has been with Howard Supply Co for 14 years, becomes Los Angeles district manager. For past several years he has served as manager of order department. Company has awarded contract for erection of 24,000-ft. addition to its Oakland warehouse to Soulé Steel Co. Work will be completed in April or early May. Expansion will enable Howard Supply to carry increased stocks of industrial supplies, pipe and abrasives for Northern California customers.

New line for Shields Harper

Shields, Harper & Co., Oakland, is appointed West Coast distributor of complete pump line of Blackmer Pump Co., Grand Rapids, Mich. Line includes industrial bulk pumps, truck pumps, and hand pumps, strainers and fluid motors.

New man for Connor Spring

John Miche is named sales engineer for Connor Spring Manufacturing Co., San Francisco. He was formerly associated with Western Regional Research Laboratory, Albany, Calif., as a mechanical engineer assigned to engineering research, design and development.

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THE West ON ITS WAY

NEW PLANTS, EXPANSIONS, NEW INDUSTRIES, PRODUCTION CONTRACTS, DEVELOPMENT PROJECTS, UTILIZATION OF RESOURCES

More jobs than ever on drawing boards

California, and Southern California, in particular, is due for an industrial boom—even bigger than those of recent years—if work now scheduled on engineering and architectural drawing boards is an indication, according to Architect Earl T. Heitschmidt speaking at the second annual Institute on Industrial Plant Design in Los Angeles early this month. Heitschmidt is vice-chairman of the Los Angeles Chamber of Commerce Engineering Consultants and Architects Committee.

"I can say for myself," he reported, "that I am busier than at any other time in 30 years of local practice. Professionals to whom I have talked agree with this.

"The projects now contemplated are those of private enterprise and not of the government.

"Work now on our drawing boards should reach contractors in the fall of this year and should continue to keep them busy for at least five years."

Mr. Heitschmidt said past industrial growth in this area was due mainly to defense work allocated by the government.

"We are now passing into a stage where industry is expanding of its own momentum.

"Proposed construction is most for existing manufacturing plants expanding present facilities. With this will come construction of facilities for commercial distributors."

1954 starts upward

Building volume in the Pacific Northwest soared to $281,539,805 to establish 1953 as the second best construction year on record, the statistical department of Equitable Savings and Loan Association of Portland reports.

The first two months of 1954 were $5,400,000 ahead of the same period in 1953, resulting solely from business, industrial and civic construction, as the value of home construction was $1,400,000 lower than for the two-month period last year.

"Hard-sell" market

"There is no doubt that we are in a 'hard-sell' market," said Alden Roach, president, Columbia-Geneva Div., U.S. Steel Corp., speaking before the American Management Association in San Francisco early this month. "The extent to which business further softens may, to a large degree, depend upon the constructive and aggressive way in which we attack the planning and organizing job which confronts us."

Plant location guide

The most comprehensive program ever undertaken to aid California communities in servicing industrial inquiries for plant locations has been launched by the California State Chamber of Commerce. Some 400 local chambers of commerce throughout the state have received forms and instruction manuals to be used in a cooperative survey of community industrial potentials. The survey is sponsored by the State Chamber's Industrial Plant Location Committee.

Truck tonnage up

The Arizona Highway Dept. and the California Dept. of Agriculture report a continually increasing entry rate for commercial vehicles. The following tabulation covers entries into Arizona and California from 1949 through 1953:

Year	Arizona	California
1949	257,386	179,324
1950	341,342	226,851
1951	437,674	272,691
1952	587,992	266,977
1953	659,158	274,939

These figures are mainly for trucks, and show clearly the steadily increasing volume of highway hauling.

Steady but cautious is the forecast

Thirty-two per cent of the companies manufacturing in California reduced their inventories of manufactured products in the three months of December, January and February, and no reversal is seen for the immediate future in the current trend of factory employment and volume of business. This is revealed in a California Manufacturers Association survey. About 23% had larger inventories; 45% reported relatively no change.

This is the largest number of companies in four years to indicate a reduction in inventories in this three-month period. A year earlier it was estimated that only 21% of the companies experienced a decline in inventory.

Twenty-four per cent of the reporting companies indicated that volume of orders booked in the second quarter of 1954 would be ahead of the like period in 1953; 42% thought they would be less and 34% about the same.

Half the companies said that average number of employees on the payroll would be the same as a year ago, 14% reported more and 36% less.

New Mexico grows

New Mexico's population in the spring of 1953 was 763,000, about 12% over the 1950 figure, according to recent estimates of the Bureau of Business Research at the University of New Mexico. The gain of 82,000 people in three years was more than half of the entire gain from 1940 to 1950, when the population rose by 150,000—a 28% increase for the decade. If the current rate of increase continues, the population of the state will be nearly one million by the 1960 Census.

Contributing factors were reported as development of irrigated land, particularly for cotton, government projects such as Los Alamos, potash, oil and uranium production.

A section of the March 1954 issue of **WESTERN INDUSTRY—609 Mission Street, San Francisco 5, Calif.**

ALASKA

WRANGELL SAWMILL—Wrangell Plywood & Lumber Corp. is incorporated in Juneau for $2,000,000 and plans operation of sawmill and plywood plant at Wrangell, to employ 250 at capacity. Mill facilities of Alaska-Wrangell Mills, Inc., may be leased by new company, with production to begin by early summer.

ANOTHER WRANGELL MILL—Pacific Northern Timber Co. of Portland plans construction of sawmill, and later pulp mill, at Wrangell on site acquired from salmon cannery. Company has requested Alaska Regional Forester A. W. Greeley to advertise Tongass National Forest timber for sale this spring to assure supplies for proposed mill.

BUY COAL MINE — Suntrana Mining Co. of Fairbanks acquires Healy River Coal Corp., which supplies coal to Elmendorf, Ladd and Eielson air force bases.

AIRPORTS—Federal Government plans to transfer ownership of airports at Anchorage and Fairbanks to territorial or municipal governments. Enabling bill will be introduced in 1955 session of Alaskan legislature.

ARIZONA

CITRUS PACKING PLANT—Construction begins on $350,000 packing plant of Arizona Citrus Growers in Phoenix. Architect is Edward A. L. Cox, and building contractor Holmes and Son Construction Co. Designed for automatic handling of fruit in cartons, facilities include a packing room 130 x 240 ft. in size and 20 conditioning rooms with total capacity of 32,000 field boxes of fruit.

G-E WAREHOUSE — Construction begins on new warehouse and office building for General Electric Supply Co. in Phoenix.

ZELLERBACH TO BUILD—New warehouse to serve Arizona produce industry will be built by Zellerbach Paper Co. on 60,000 sq. ft. site adjoining present warehouse and offices in Phoenix.

MORE GRAIN STORAGE — Arizona Flour Mills Co. plans to add total of 20,000-ton grain storage facilities in Phoenix, Casa Grande, Glendale and Safford.

FORECASTING — Technical survey of future of northern Arizona is under way by Burt C. Blanton, consulting industrial engineer and economist of Dallas, Tex., sponsored by Southern Union Gas Co.

CALIFORNIA

UNDER CONSTRUCTION—New quarters for Hermann Safe Co., are now under construction at Market and Valencia Sts. in San Francisco by Rothschild, Raffin & Weirick. The 26,700 sq. ft. building, to be occupied around August 1, will house manufacturing facilities, sales and general offices and storage, and features one door designed to allow ready-mix cement trucks to roll inside and dump load.

NEW SET-UP—Pacific Airmotive Corp., Burbank, reorganizes its manufacturing under two divisions: Test and Handling Equipment division, to administer Burbank plant as well as planned manufacturing facility at Linden, N. J.; and Aero-Pneumatics division, for manufacture of pressure and temperature control equipment. Carl R. Wettereau joins firm as manager of former division.

PLANT ADDITION—California Metal Enameling Co., Los Angeles, adds new building providing 12,600 sq. ft. additional floor space for research and manufacture in field of ceramic coatings and porcelain enamel.

BUY CLAREMONT PLANT—Industrial Asphalt of Los Angeles acquires 4,000-lb. batch type asphalt plant at Claremont from Tom Moore at an approximate cost of $225,000. Another asphalt plant in Claremont will be opened by company within a month or two.

FOR GRAYSON CONTROLS — Construction is under way in Long Beach on new 237,000-sq. ft. plant to house Grayson Controls division of Robertshaw-Fulton Controls Co., now located in Lynwood. Plant will employ about 2,400 people, with an annual payroll of $7,000,000, in manufacture of electronic devices. Buildings were designed by Quinton Engineers, Ltd. and contractor is Lindgren & Swinerton, Inc., of Los Angeles.

ELECTRODATA — Consolidated Engineering Corp., Pasadena, forms new wholly-owned subsidiary, ElectroData Corp., also in Pasadena, to continue engineering, manufacturing and sales activities formerly carried out by firm's computer division.

FORMS OWN COMPANY—R. J. Lison establishes new company, Line Mfg., Inc., for manufacture of industrial power sweepers in Los Angeles.

MERGER APPROVED—Stockholders of both companies approve merger of Foremost Dairies, Inc., and Golden State Co., Ltd. Present officers will continue to manage companies.

DODGE BUILDS PROPELLERS—Dodge plant of Chrysler Corp. in San Leandro opens propeller division, already in production on blades for Hamilton Standard propeller, used on Boeing C-97. Operation occupies 150,000 sq. ft. and employs at present about 250 persons. Division will produce full assemblies, using locally produced blades.

COSMETICS PLANT—Construction is under way on $500,000 West Coast plant for Helena Rubinstein Inc. near Los Angeles International Airport.

NAM MOVES—Pacific Central Regional offices of National Association of Manufacturers are moved from San Francisco to Palo Alto.

BIGGER SMO—Small Business Office of San Francisco Ordnance District, Oakland, expands with addition to staff of Howard H. Josephs, business analyst, to assist in surveying small firms as sources of Army Ordnance procurement. SMO provides bid information and counselling services to small business firms bidding on Ordnance contracts in area of Northern California, Oregon, Washington, Nevada, Idaho, Wyoming and Montana.

PG&E PROPOSAL — Pacific Gas and Electric Co., San Francisco, files application with Federal Power Commission for McCloud-Pit River development northeast of Redding which includes two-stage construction of eight dams, five tunnels and two powerhouses, with generating capacity of 232,000 kw., at estimated cost of $89,000,000.

CHASE IN LOS ANGELES—Chase Brass & Copper Co. occupies its new 50,000-sq. ft. Los Angeles warehouse, built by George W. Carter Co. from plans by architect John J. Kewell. Chase is a subsidiary of Kennecott Copper Corp.

SECOND PLANT—Specification Packaging Engineering Corp., Burbank, opens second plant in city which will house company's boxing and crating division.

RELAY RESEARCH—U. S. Relay Co., Los Angeles, is picked by Boeing Aircraft, Seattle, to develop electronic relay unit for supersonic aircraft.

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ARMY ORDERS SHELLS—Rheem Manufacturing Co., Richmond, Calif., receives Army Ordnance order in amount of $2,892,500 for 155 mm chemical shells. Participants in contract signing are (left to right): Jack Blum, Rheem San Pablo plant manager; Carlos H. Horne, assistant general manager, Rheem Western Division; Claude Gillette, Ordnance contract negotiator; and Col. John M. Stark, San Francisco Ordnance District Commander.

REFUND TO ARMY—Yuba Manufacturing Co., San Francisco, returns $108,000 to San Francisco Ordnance District, under a contract for 155 mm. howitzers which provides for periodic review of manufacturing costs. Sum is part of $1,600,000 in economies effected by Yuba in fulfilling contract.

PROMOTE MADERA—Madera County Industrial Development Corp. is organized as a subsidiary of county Chamber of Commerce to head program for bringing heavy and light industry into area.

PLANT SOLD—Potts Bros. Transmission and Equipment Co., Cloverdale, is acquired by Klamath Machine and Locomotive Works of California, Klamath Falls, Ore.

PLANT EXPANSION—Pacific Coast Co. of Willits will expand facilities at a cost of $150,000, adding a resaw and planer.

CAN LABELING MACHINERY—Work on can labeling machinery will occupy 6,000 sq. ft. quarters in new building at Alvarado, backed by Rene Gaubert.

NEW DOG FOOD PLANT—Sturdy Dog Foods, Los Angeles and Oakland, buys site from San Leandro Industrial Corp. for building $100,000 dog food plant. Contractor for 10,000-sq. ft. building is Pre-Cast Erection Co. of Niles.

ADD AT REDONDO BEACH—Southern California Edison Co. proposes new 156,000 kw. steam, generating plant, to cost $25,000,000, adjacent to its present plant in Redondo Beach, in application before California Public Utilities Commission.

NEW FREEZING PLANT — Construction begins in Santa Clara on new freezing plant for Pictsweet Foods Inc., scheduled for completion in May. Plant will cost about $225,000 and provide 93,000 sq. ft. of processing area. Headed by R. H. Ledum, new plant will replace smaller quarters occupied since 1942.

BUY TV FIRMS—Clear Beam Television Antenna Co., Burbank, and Tempo T.V. Products Co., Los Angeles, are acquired by Gerald and Harold Florence, for capital investment of over $1,000,000. Two firms will be operated independently of Benchmaster Manufacturing Co., Gardena, which is headed by Gerald Florence.

JOINTLY OWNED—New firm, Plastic Pipe & Tube Corp., Santa Barbara, is formed under joint ownership of Resin Industries, Inc., Santa Barbara; Anesite Co., Chicago; and Gen. P. M. Hamilton, USAF (ret.), Santa Barbara. Firm will employ about 25 persons in leased facilities for production of plastic pipe.

LEMON JUICE—Santa Barbara Coastal Lemon Co. plans to build three-unit 45,000-sq. ft. lemon packing and juicing plant in Santa Barbara, to cost about $300,000.

BUY PACKING PLANTS—Van Camp Sea Food Co., Inc., San Diego, acquires plants at Long Beach and San Diego operated by West Coast Packing Co., for sale price of about $300,000. Van Camp will maintain West Coast sales division to market tuna and tomato paste under that label, and West Coast San Diego tuna cannery for use as a standby facility, but the Long Beach plant will be dismantled.

WOOD OVER THE COUNTER—Northwest Packaged Wood Products Co. begins marketing in Los Angeles area 20-lb. plastic-wrapped packages of select hardwood for home craftsmen. Backers of new firm are Ivan Linscott and Howard Brines of Centralia, Wash., and Fred Fulton, Santa Barbara. Wood is presently being packaged in Chehalis, Wash., on a trial basis.

FLUOR CONTRACTS — Fluor Corp., Ltd., of Los Angeles begins construction of $10,000,000 petroleum refinery in San Juan, Puerto Rico, for Caribbean Refining Co. Fluor also receives contract for 29,000-bbl. platforming unit at Port Arthur, Tex., for Gulf Oil Corp.

WINERY CHANGES HANDS — Vineyards, buildings, equipment and inventory of F. Korbel & Bros., Inc., at Guerneville are sold for about $750,000 to Adolf L. Heck, former president of Italian Swiss Colony Wine Co., and his brother, Paul R. Heck, former production manager for that company.

WORK CONTRACT—North American Aviation Corp. contracts with United Cerebral Palsy Assn. Vocational Training Center in Los Angeles for work to to be performed by cerebral palsied adults, including training of one precision tool grinder.

SUNKIST SELLS PINE—Fruit Growers Supply Co., Los Angeles, subsidiary of Sunkist, sells 82,000-acre tract of pine to McCloud River Lumber Co., McCloud. Timber was held as reserve source of supply for container manufacturer, and company retains rights to fir found on acreage, which may some day be worked by a proposed mill at Burney for new type of citrus container.

TOOLS AND DIES—Pentacron Corp. leases facilities in San Diego for manufacture of hard metal tools and dies.

PLAN BREA PLANT—Brea Chemicals, Inc., subsidiary of Union Oil Co., awards contract to C. F. Braun & Co. for planning nitric acid and ammonium nitrate plant. Proposed $2,500,000 plant is to be located adjacent to $13,000,000 ammonia plant scheduled for completion at Brea in April. Built for Amoniaco Corp., ammonia plant will be leased by Brea Chemicals.

ANTIOCH PLANT — Gould-National Batteries, Inc., St. Paul, Minn., buys 20-acre site in Antioch for its second automobile storage-battery plant in California. Plant, to cost $1,000,000, is scheduled to begin production in mid-year.

TO SURVEY VALLEJO—Industrial site survey of Vallejo area, in Solano County, including cities of Vallejo, Benicia and Vacaville, will be made by Robert P. Danielson, San Francisco industrial planning consultant.

MAY PICK RED BLUFF—Ecusta Paper Corp., Pisgah, N. C., files options on two 200-acre tracts of land near Red Bluff, Tehama County, for $10,000, as possible site for new manufacturing venture, which will reportedly require $15,000,000 plant and 250 to 500 workers. Ecusta Paper, a subsidiary of Olin Industries of New Haven, Conn., manufactures forest products, including cellophane, fine paper and cardboard.

PLAN BOOM YEAR—Standard Oil Co. of Calif. plans 1954 expenditures of about $275,000,000 for capital and exploratory purposes, exceeding 1953 outlays by over $50,000,000.

ENLARGE LODI CEREAL PLANT — General Mills Inc. awards contracts for expansion of facilities at its Lodi cereal plant, including new 1-story rail shipping facilitiy and third and fourth floor extension to present plant to house new processing unit. Johnson and Mapes, Menlo Park, will build shipping center; Nomellini Construction Co., Stockton, the building extension.

LOS ANGELES MERGER—Acme Sash Balance Co. becomes a division of Duplex, Inc., through sales of inventories, fixed assets, patents, trademark and name of Duplex, manufacturer of adjustable and pre-set sash balances. Both firms are located in Los Angeles.

SHOE FACTORIES IN WEST — E. F. Forbes, president and general manager of Western States Meat Packers Assn., reports eastern shoe manufacturer plans tannery and three factories in West, two for California and one for Northwest, providing future market for hides now exported or sent east.

MISSILES ON THE MOVE—Lockheed Aircraft Corp. is moving Missile Systems division from Burbank to larger quarters at Van Nuys plant, modernized and equipped at cost of over $1,000,000. Move will be completed April 1.

NAVY CONTRACT — Lockheed Aircraft Service, Burbank, receives Navy contract for overhaul and modification of Neptune P2V5 and P2V6 aircraft, to include installing special submarine-detection equipment.

COLORADO

FIRST LOANS TO SMALL BUSINESS—Small Business Administration gives tentative approval to $200,000 loan to Universal Electric Western Co., Colorado

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Springs and $15,000 loan to Western Concrete Pipe Co., Inc., Denver.

STANLEY BUILDS — Construction begins on $308,000 building for Stanley Aviation Corp. adjoining Stapleton field, Denver. Plant, which will produce military aircraft ejection seats and automatic safety belts, is scheduled for completion by mid-August.

CANDY COMPANY SOLD — Brecht Candy Co., Denver, is sold to group of Denver and Chicago candy manufacturers for over $200,000. L. N. Duryea and Assoc., Chicago, now hold controlling interest in firm.

NEW OIL COMPANY — Great Basins Petroleum Co., Denver, is incorporated with initial capitalization of $6,000,000, formed by pooling of assets of several oil operators. Principal stockholders are C. G. Glasscock, Jr., Corpus Christi, Tex., who will serve as president, and Frank R. Anderson of Santa Maria, Calif., vice president.

SPUR URANIUM SEARCH — Atomic Energy Commission opens public lands already covered by oil and gas leases for mineral exploration, affecting an estimated 60,000 sq. mi. of federally owned land, principally on Colorado Plateau. Uranium prospectors under new regulation will be allowed to lease maximum of 2,000 acres each on lands with prior oil and gas leases.

BUY PILOT PLANT — Central Ohio Steel Products Co., Mansfield, Ohio, plans to take over Denver pilot plant operation of John Austin, Sr., who has developed new overhead truck or railroad car loading device, and begin large-scale production of loader. Company may also move manufacture of other products to Denver.

IDEAL PLANS PLANTS—Ideal Cement Co., Denver, is considering construction of plants for production of light concrete aggregates at Denver and Salt Lake City, each to cost $1,000,000. Decision will be made by July 1.

REA LOAN GRANTED—Intermountain Rural Electrification Assn., Littleton, receives $1,350,000 loan from REA, to be retired over 35 years, for improvement and extension of service in nine counties of Colorado. Work is scheduled for completion by autumn.

COLEMAN MERGER—American Coleman Co. of Colorado, Littleton, buys majority stock of American Coleman Co. of Nebraska and succeeds Coleman Motors Corp. at Littleton, which will be dissolved. All manufacturing operations will now be centered in Littleton.

GM TRAINING CENTER—General Motors Corp. plans to locate one of its regional training schools for automotive service personnel in Denver, and will build $250,000 center for that purpose.

NEW TUNGSTEN MILL—Mining Ventures, Inc., Pueblo, will construct new mill near Salida to process tungsten ore from Lucky claim. Company plans to build mills later in Guffy and Lake George areas, where it also owns claims.

NAME CHANGE—Longmont Brick & Tile Co., Longmont, changes firm name to Colorado Brick Co. Firm plans to build sales headquarters in Denver within next few months.

PIPELINE PROJECT—Continental Oil Co., spokesman for oil operators in Little Beaver and Badger Creek fields, announces plans to build $1,000,000 gas pipeline gathering system and compression facilities serving two fields, to be in operation by midsummer. Operators represented are Continental, Col-Tex Oil, Denver Basin Oil, Forest Oil, Lion Oil, Goodall Oil, Sinclair Oil & Gas, Triangle "J" Oil and Calstar Petroleum Companies.

TO PRODUCE TRACTORS—New company will occupy one building of Gibson Manufacturing Co. plant, now idle, at Longmont to manufacture three types of small tractors. Harold Botteron, head of Laurel Manufacturing Co., Denver, is backing venture.

MORE COLD STORAGE—Colorado Ice & Cold Storage Co., Denver, which recently enlarged its capacity to 2,500 tons of commodities in 300,000 cu. ft. of storage space, is under way on second project of about the same size. Work will cost about $75,000 and be completed by April 1.

IDAHO

SELL TRUNK FACTORY—Boise Trunk Factory, Boise, is sold to Sumner Whipple, Seattle.

TO START IN APRIL—Sulphuric acid plant of Sullivan Mining Co. near Kellogg, which will recover acid from waste sulphur gases produced in zinc smelting, is expected to begin partial production in April. Capacity of plant will be 250 tons daily. Firm has appointed General Chemical division of Allied Chemical and Dye Corp., with branch office in Seattle, its sales agent, to explore possible markets for sulphuric acid.

AEC ASKS FOR BIDS—Idaho operations office of Atomic Energy Commission will open bids March 31 on construction of a plant for ground testing of atomic airplane engine. Contract for Aircraft Nuclear Propulsion project will go to one bidder and is expected to be in neighborhood of $2,500,000 to $3,000,000.

NEVADA

SHELL STRIKES OIL—Shell Oil Co. discovers oil 60 miles southwest of Ely on its first drilling venture in Nevada, and stimulates gas and oil lease boom on federal lands in vicinity.

NEW MEXICO

LIGNITE FOR MUD—Olson Mud Service of San Pedro, Calif., begins lignite operations in Gallup, to produce powdered lignite for use in drilling oil wells. Company will mine, dry, pulverize, bag and ship lignite.

OREGON

PLYWOOD EXPANSION — Brookings Plywood Co., Brookings, plans 50% expansion of plant output, with $250,000 investment in new facilities.

NEW BOARD FROM WASTE—Weyerhaeuser Timber Co. will build plant at its North Bend mill site for manufacture of particle board, wood panel made of planer-mill shavings and synthetic resins. Annual production target of about 11,500,000 sq. ft. of ¾-in. panels will be made entirely from wood waste. Plant, to be completed in early 1955, will employ about 40 men on three-shift basis.

REFURBISH ST. HELENS—Crown Zellerbach Corp. will spend over $14,000,000 for modernizing and expanding its St. Helens mill, and plans to add new tissue machine now being built at Beloit, Wis., reportedly largest of its kind in world, with capacity of 35,000 tons a year. Program will take several years to complete, but tissue machine will be in operation early in 1955.

PORTLAND GRAIN TERMINAL — Portland Commission of Public Docks signs agreement with Kerr, Gifford & Co., Inc. for 20-year lease of grain elevator at Terminal No. 4 and construction this year of eight steel tanks and car dumper to add 5,400,000 bushels additional capacity. Cost of facilities, estimated at $2,000,000, would be covered by municipal bonds. Annual payments by Kerr, Gifford are expected to amount to about $300,000.

POPE & TALBOT VENTURES—Pope & Talbot, Inc., Portland, acquire wood treating plant of Oregon Lumber Co. at Linnton and will move equipment to St. Helens, as part of expansion program of Pope & Talbot plant there. At Oakridge lumber mill company's pilot plant for manufacture of soil conditioner from sawdust begins production at rate of one ton hourly.

HARDBOARD PLANT OPENS — Oregon Fibre Products, Inc., begins operations at its $5,000,000 hardboard plant at Pilot Rock.

TIMBER PURCHASE—Murphy Logging Co., Portland, buys 7,000 acres of timberland in northeastern Oregon from Dr. J. W. Geyer and W. E. Anderson of Walla Walla. Company plans to build mill at Minam to cut studding, using timber which has grown since land was cut over 20 years ago.

PLANT AT SWEET HOME—Construction starts on chipper unit at Sweet Home, to cost $60,000, first stage in hardboard and chipboard plant planned by Willamette Fibre and Chipboard, Inc. Complete plant will represent $750,000 investment.

OREGON CENTER FOR GM—General Motors Corp. selects Tigard as location of one of its training centers for GM service personnel and mechanics. Selected list of contractors have submitted bids to GM headquarters in Detroit.

FPC LICENSE — Federal Power Commission issues 50-year license to California-Oregon Power Co., Yreka, Calif., for proposed hydroelectric development on Klamath River in Klamath County, Ore.

UTAH

COKE FROM PILOT PLANT—American Gilsonite Co.'s pilot "melt" plant at Bonanza succeeds in producing coke

from liquid gilsonite. Decision on whether to go forward with major plant facilities will depend on favorable outcome of experimental use of coke as electrodes by aluminum industry. American Gilsonite is a joint subsidiary of Standard Oil Co. of Calif. and Barber Oil Corp.

$2,000,000 FOR CLAY—Filtrol Corp. considers $2,000,000 purchase of halloysite clay deposit from Dragon Consolidated Mines Co., affiliate of International Smelting & Refining Co. (Anaconda Copper Mining Co.). Filtrol presently buys clay from the Eureka mine for conversion into a catalyst used in its Salt Lake oil refinery.

FERTILIZER STORAGE—Farm Equipment Sales and Service builds 30,000-gal. storage tank for anhydrous ammonia fertilizer at West Jordan, reported to be first supply maintained locally.

SELL SURPLUS MACHINERY—Simco division of Standard Iron and Metal Co. will set up a surplus machinery and equipment yard in Salt Lake City to dispose of equipment from Brilliant and Sugarite mines at Raton, N. M., recently purchased by company from St. Louis, Rocky Mountain and Pacific Co.

GENERAL MOTORS BUILDS—Electro-Motive division of General Motors Corp. awards contracts for steel on its new factory branch in North Salt Lake City to Western Steel Co. Plant will employ up to 100 persons.

WASHINGTON

BREWERY SOLD—Fire-damaged plant of Pioneer Brewing Co., Walla Walla, is purchased by Eugene Tausick and Eugene Ritchie, who plan to remodel it for offices and warehouse space. Sale includes engine room equipment and bottling plant; brewing equipment is being removed by former owner.

CANADIAN POWER PLAN—Giant hydroelectric project for East Kootenay area of British Columbia is in planning stages, with construction predicted to start in two years. Canadian and American representatives on International Joint Commission will meet in April to decide upstream and downstream benefits, fix compensation and give final approval to project. First dam is sited on Mica Creek, to be followed later by construction of eight other dams on Columbia and Kootenay Rivers in Canada.

EXPAND RESEARCH—Weyerhaeuser Timber Co. will open new research laboratory at its Everett plant this summer, headed by Dr. J. D. Reagh, associate director of research department, who is now at Longview. Longview laboratory will be expanded and moved into new quarters to be completed in June. Staff of 20 to 25 persons will concentrate on paper and paperboard products. Everett laboratory will conduct experiments for high grade pulp and cellulose products.

NEW NAME—Alaska Fast Freight, Inc., Seattle, is renamed Garrison Fast Freight, Inc.

ALCOA SEEKS POWER — Aluminum Co. of America is exploring possible long-term supplies of economical electric power in Pacific Northwest and states it will consider investing its own money to assist in expanding hydroelectric power.

RESEARCH ON PEAS—Blue Mountain Grower and Processor Research Committee is organized at Walla Walla to serve green pea growers, processor representatives and researchers. Committee will coordinate research and plan the financing of future permanent projects.

BUY WAREHOUSE — Georgia-Pacific Plywood Co., Olympia, acquires Plywood Mill Jobbers, Pasco wholesale distributing warehouse.

FORM PACIFIC SEVEN—New firm, Pacific Seven, Inc., is organized in Seattle to market frozen fruits and vegetables nationally for institutional trade. General manager is William E. Priest.

GRAIN STORAGE SHIPS—Plans call for 89 grain storage ships from reserve fleet in Columbia River to be loaded at Longview, Astoria, Vancouver and Portland and towed to storage basin near Astoria. Loading will reportedly get under way about mid-May, following dredging of Astoria storage basin.

TELEPHONE PROJECTS—Pacific Telephone and Telegraph Co. will spend $5,500,000 in eastern Washington and northern Idaho in 1954 in extending service or installing new equipment.

NEW FERTILIZER—New plant of Stauffer Chemical Co. at Tacoma begins production of ammonium phosphate-sulphate, new fertilizer for Pacific Northwest.

HANFORD PILOT PLANT — Sound Construction & Engineering Co., Seattle, is awarded $167,907 contract by Atomic Energy Commission to build pilot plant for development work at Hanford.

SECOND SCOTT PAPER MACHINE—Scott Paper Co. awards contracts to Howard S. Wright Co., Seattle, and American Pile Driving Co., Everett, for building second paper machine at Everett. First portion of Everett plant, an $11,500,000 structure has been dedicated and work on current contracts is under way, with completion scheduled for mid-summer.

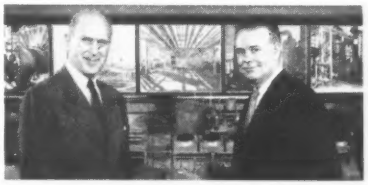
BOEING BUILDING — Boeing Airplane Co. will build $10,000,000 supplemental test facility for B-52 jet bombers at Larson Air Force Base, Moses Lake, employing 800 persons. Construction is scheduled to begin this year on contracts awarded by Boeing. Boeing will also build a $1,000,000 jet fueling station and underground tanks on 11 acres of leased land adjoining county-owned Boeing Feld.

MORE PRODUCTION—United Control Corp., Seattle, is building new $250,000 plant, to be completed late this year, which will nearly double production and laboratory space. Company manufactures automatic controls for aircraft industry.

MAY BUILD PLANT—Alsco Northwest, Inc., national manufacturer which recently set up sales office in Pasco, is considering construction of $50,000 assembly plant in Washington for production of aluminum windows and doors this year.

SCREEN DOORS—Vancouver Door Co. leases part of its Montesano plant to new company, Montesano Screen Door Co., which has production target of 500 doors daily.

WYOMING



MANDERSON PLANT MODEL—George F. Wilkins (left), vice president of Jefferson Lake Sulphur Co. in charge of Western operations, and Tom A. Atkinson, director of Socony-Vacuum Oil Co.'s activities at Manderson, Wyo., inspect scale model of portion of sulphur recovery plant to be built this year at Manderson, near natural gas fields of eight oil companies. Initial unit will have capacity of about 45,000 long tons a year and will process equivalent of 15,000,000 cu. ft. of sour natural gas a day.

TRI-STATE POWER PLANT—Tri-State Generation and Transmission Assn., Fort Morgan, Colo., will apply to Rural Electrification Administration for approval and loan to build $10,500,000 co-operative steam generating plant to serve parts of Colorado, Nebraska and southern Wyoming. Tentative site is Pine Bluff area of southeast Wyoming. Plant is scheduled for operation by 1957.

GOVERNMENT SELLING PLANT—Bureau of Mines will relinquish operation of experimental alumina plant at Laramie June 30. General Services Administration is charged with disposition of property and will consult with Wyoming Natural Resource Board, which represents state's interest in keeping plant in Wyoming as an industrial operating unit.

REFINERY EXPANSION—Frontier Refining Co. completes $1,250,000 expansion at its Cheyenne refinery, which included expansion of catalytic cracking unit from 2,600 to 6,500 bbl. a day and installation of new 6,000-gal.-per-min. forced air cooling tower, and equipment for production of propane gas.

BOOST PRODUCTION — Hammond Iron Works, Casper, undertakes $200,000 enlargement of its facilities for manufacturing oil storage and processing tanks, steel framework and other oil field equipment.

MAY DOUBLE PAYROLL—Land Air, Inc., Cheyenne, is planning to add over 200 men to its work force in order to take care of anticipated $4,000,000 worth of government contracts for aircraft modification kits. Present employment is about 240 persons, with $80,000 monthly payroll.

TITANIUM—Union Pacific locates large deposits of iron ore, part of it occuring with 19% titanium and 1% vanadium, in exploratory drilling in Iron Mountain area of southeastern Wyoming. Titanium-bearing deposits may prove to be largest of their type in United States.

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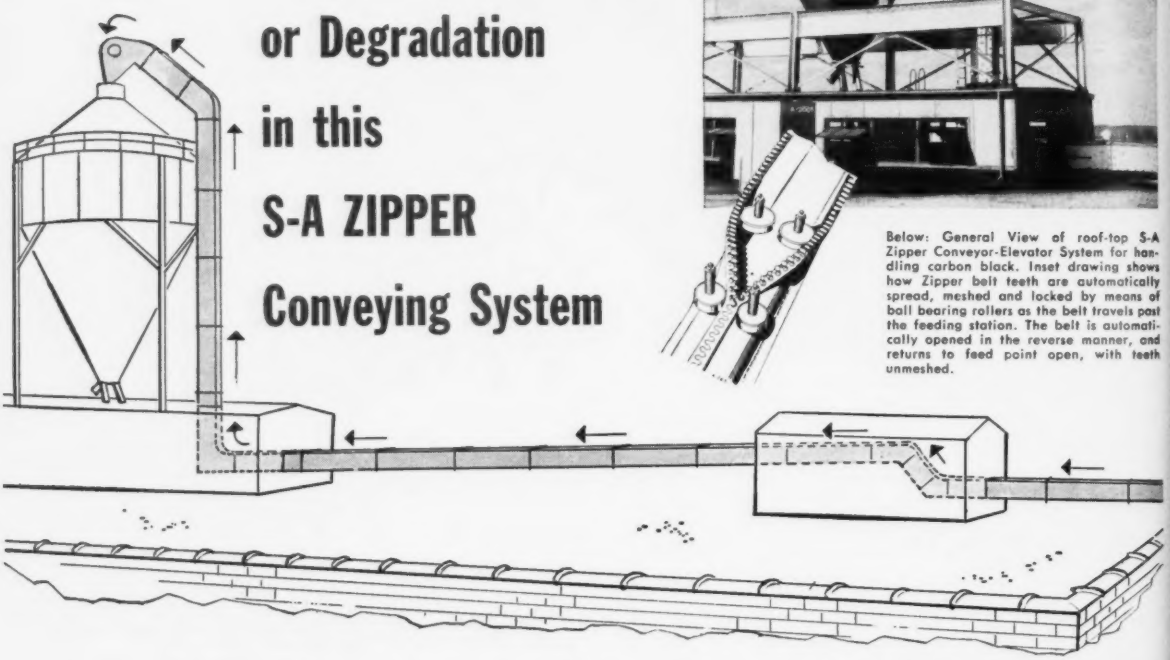
CARBON BLACK

Moves Without Dust or Degradation in this S-A ZIPPER Conveying System



Below: General View of roof-top S-A Zipper Conveyor-Elevator System for handling carbon black. Inset drawing shows how Zipper belt teeth are automatically spread, meshed and locked by means of ball bearing rollers as the belt travels past the feeding station. The belt is automatically opened in the reverse manner, and returns to feed point open, with teeth unmeshed.

Dust, degradation and maintenance problems in the handling of carbon black faced the B. F. Goodrich Co., Miami, Oklahoma, until S-A engineers solved the problems easily and economically with an S-A ZIPPER Conveyor Elevator.

With the new ZIPPER, carbon black is moved a total horizontal distance of 178 feet with a vertical lift of 70 feet. It discharges at the rate of 9½ tons per hour to a three compartment steel bin. From storage, black moves to a combined weigh hopper and blending bin and is then discharged to a mixer. Because the ZIPPER belt completely encloses black and moves with it, there is no dust or degradation. As the ZIPPER operates out-of-doors it is completely enclosed in a steel casing.

If you have a dust or degradation problem, why not find out what an S-A ZIPPER Conveying System can do for you? Mail coupon for data.

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